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See Page 19

MODERN TRANSPORT

"THE TIMES" OF THE TRANSPORT WORLD

MODERN BRAKES FOR PROTOTYPE STOCK

See Page 9

VOL. LXXXIV No. 2167 [*Registered at the G.P.O. as a newspaper*] LONDON, NOVEMBER 26, 1960 PRICE ONE SHILLING

CURRENT TOPICS

Transport Policy

CONSERVATIVE policy for transport was guided by four principles, said Mr. John Hay, M.P., Joint Parliamentary Secretary, Ministry of Transport, last week. "Competition, in transport as in so many other fields in our national life, gives flexibility," he said. "Our society, and certainly our industry, obtains great benefits from its diversity. We should stick to our time-honoured principle of 'trusting the people'. Individuals will decide what means of transport they wish to use, and this must be accepted. We must seek to accommodate public demands and needs and not to direct them. This inevitably means that we should not seek artificially to stem the move to private transport—on the contrary it means that we must improve the road system as quickly as we can to accommodate it. Since there will always be traffic which will go more efficiently and economically by rail, we must modernise our railways. Our fourth principle should be this," he declared. "We reject the concept of 'integration,' but in its place we seek co-ordination of transport."

Sir Henry Spurrier and I.R.T.E.

PROPOSING the toast to the Institute of Road Transport Engineers at that body's recent annual dinner and dance, Sir Henry Spurrier, chairman and managing director, Leyland Motors, Limited, said that as a vehicle manufacturer he was the first to recognise and appreciate how much was learned from the varied experiences of engineers who operated the vehicles under all kinds of conditions. In his view 99 per cent of new design was hard-earned operating experience and 1 per cent new invention. Road transport, said Sir Henry, had grown up since the war of 1914-18 to become by far the greatest of all forms of transport. But it was no time for complacency as there would be fierce competition to face from other forms of transport, particularly aviation. To keep road transport supreme, cost must be progressively reduced and by far the most important item towards that aim was a system of roads that would permit traffic to flow at a steady speed. The Institute, with its fund of specialised knowledge in such matters, could make a worthwhile impact on the Minister of Transport and that objective should be pursued unremittingly. Given the ability to operate uninterrupted at more or less constant speed, a type of vehicle could be developed to give its most efficient operation under such conditions in which it would be prudent to allow materials to be more highly stressed with the main object of saving weight, which was one of the chief offenders where operating costs were concerned. Sir Henry thought it would not be impossible to achieve something of the order of 1 ton unladen weight for every 5 tons of load. Sir Henry ended his address with a suggestion that more could be done by the user side of the industry to further specialised technical education of young entrants, similar to the established apprenticeship schemes operated in the larger engineering concerns, particularly among heavy vehicle manufacturers.

Response by Sir William Black

RESPONDING, Sir William Black, chairman of A.E.C., Limited, and president of the Institute of Road Transport Engineers, said that the Institute had the vital need for technical training on an ever-increasing scale very much in mind. The best type of youth must be attracted into the industry and must be given facilities to learn the theory and practice of the basic problems confronting them. It was no longer good enough to pitchfork them into a job and leave them to sort things out as happened two or three decades ago. Road transport law in its application to operation, vehicle selection for given operating conditions, costing of operation and maintenance, design and layout of workshops—these were the basic subjects the executive engineer must grapple with and the groundwork must be sound. The entrant to the industry would then be convinced of a promising future and an interesting and worthwhile career. This was the challenge lying ahead of the Institute and it was certainly one of its chief objectives. Sir William said that his own experience as an engineer had been mainly on production, but he had had responsibility for fleet maintenance both at home and abroad. One thing, he said, was certain. You could not divorce manufacture and maintenance and vehicle builders were learning from the operator all the time. The Institute members filled a dual role in keeping the wheels turning in transporting a mass of men and material and in helping manufacturers to improve the breed. Between them they had made the British commercial vehicle the finest in the world.

Bridge or Tunnel?

THE controversy about the best means of spanning the English Channel goes on. Latest critic of the tunnel proposal is Sir Owen Williams, architect, civil engineer and designer of the M1. Improvement of the crossing must be drastic if done at all, he says, and its value would almost entirely accrue from the passage of motor vehicles; hence his advocacy of a bridge. He compares the present "trickle" of 350,000 vehicles ferried a year with the five million using the M1 and sees little reason to envisage less ultimate traffic between London and the Continent than between London and Birmingham, for example. A bridge, he says, has the outstanding advantage of not having to embody the severe restrictions, either in width or height, inevitable in any tunnel. Spacious dimensions on a bridge can be obtained with little, if any, extra cost. He regards it as axiomatic for safety and efficient capacity that a road bridge should have two completely segregated carriageways and that their separation can be most economically achieved by having one above the other. His favoured design would provide for a structural tube about 50 ft. square, the sides being perforated for ventilation. The roof of the upper carriageway would be constructed for either two railway tracks and two service roads, or it could be a third carriageway operating in fine weather and peak traffic periods. As against the Channel Tunnel Study Group's estimate of £125 million for a railway tunnel Sir Owen suggests a figure of £175 million for a combined road and rail bridge. As regards vehicle capacity, he estimates two million a year for a rail tunnel, three million for a two-lane road twin tunnel and 20 million for the road and rail bridge.

Supersonic Air Transport

DELIVERING the 16th British Commonwealth Lecture of the Royal Aeronautical Society, Mr. J. R. D. Tata, the chairman of Air-India International, gave a comprehensive survey of the development of Indian air transport, to which we hope to return in a subsequent issue. Meanwhile, in the light of his close connection with its development from 1932 when Tata Airlines inaugurated the Bombay—Madras mail service, with him as one of the pilots, to the present time, it is worth placing on record his views as to the future of international air operations. He was opposed to anything being done which might discourage or deter the development of supersonic flying, but it was at the same time to be hoped fervently that it would not be forced upon the world of air transport for reasons of prestige or political rivalry between power blocks, before all the technical and economic problems had been solved. Some of these were of such magnitude and complexity that regular operation at sustained supersonic speeds was unlikely to be possible until the end of the present decade. He felt that supersonic aircraft could only supplement and never supersede subsonic machines because of the extreme altitude at which they must operate, together with the limitations likely to be imposed by the noise and destructive impact on the ground of their own shock wave. Supersonic aircraft would probably be useful and economically employable only on long nonstop flights which were mostly over water. Until now airlines had attempted to combine in a single vehicle the largely incompatible requirements of luxury, speed and economy. The advent of the supersonic jets might well force the industry into a new pattern in which separate types of aircraft best suited to each kind of operation would be used. Whatever the ultimate pattern, the sooner realistic thinking was done on the next step, particularly as regards satisfying the vast untapped demand for cheap air travel, the sooner would air transport reach its full stature.

Traffic and Deliveries

IN addressing members of the London and Home Counties Division of the Traders' Road Transport Association on traffic problems, Mr. J. L. Waldron, Assistant Commissioner, Metropolitan Police, paid a pleasing tribute to the knowledge and acumen of the divisional secretary, Mr. R. E. G. Brown, whose advice had been of great help when determining what spaces to leave for loading and unloading of goods vehicles in setting out parking-meter schemes. These, he predicted, would spread from the centre soon to Shoreditch, Woolwich and Croydon. Objections became fewer as experience was gained and they had succeeded in freeing traffic flows without attempting to impose unenforceable restrictions on the private motorist. Because people knew where to park the meter schemes had given more room for commercial vehicles to load and unload without having to resort to double banking. The regulations enabling private cars and dual-purpose vehicles to stand for 20 min. for loading and unloading had, however, been abused, and it was difficult to deal with offenders, hence the controversial experiment for a few months of denying them that privilege. The wardens were a fine body of men and complaints had concerned the system more than the wardens themselves. The police had to keep traffic moving on the radial routes and therefore it was vital to have no parking close to intersections. They would prefer deliveries to be done in the morning if possible. The Assistant Commissioner rightly sees off-street garages in the central area as a likely source of intolerable congestion in the morning and evening peaks if they were used by commuter car owners and appears to favour a ring road studded with garages with park-and-ride facilities. Although more one-way streets were under consideration they were not without their difficulties and might cost £50,000 to install because of sign, refuge and kerb alterations. Tidal flows needed at least five-lane streets—a width of 50 ft.—to be as successful as that on Chelsea Bridge was. Mr. Waldron spoke at a luncheon presided over by Mr. H. C. Chandler, divisional vice-chairman, in the absence of Mr. S. Hattan, who is recovering from indisposition and to whom good wishes were sent by the members present.

LEADING FEATURES IN THIS ISSUE

	PAGE
Portrait	
The late Sir John E. Thornycroft, K.B.E.	11
Special Articles	
Great Eastern Suburban	2
North-East London Electrification: Inauguration of Intensive Services	3
G.E. Suburban Developments	6
George Mortimer Pullman: By Ivan E. Broadhead. 2: "Pioneer" (cont.)	8
Prototype Tube Stock for L.T.E.	9
Programme Machines: Lively I.R.S.E. Discussion	12
Pallets for Casks or Drums	13
Handling Without Pallets on Reach Trucks	13
Fork-Trucks Go Abroad	13
Swan-Neck Conveyor: Hydraulic Boom	13
C- to A-Licence Appeal: Merchandise Transport Case Opens	14
Steel Firm Development	16
Diesel-Electric Chain Ferry for Cornwall County Council	16
Leedsall Dump Trailer	16
Phenolic Resin Foam	16
Consumer Goods Distribution: Aspects of Service. By Medwyn Ormerod	17
Modern Airways Section	
A Fortieth Birthday: Another Qantas Landmark	7
Regular Features	
B.T.C. Traffic Receipts	12
Commercial Aviation	11
Forthcoming Events	12
Financial Results	20
In Parliament	11
Important Contracts	20
Letters to the Editor	11
Lorry, Bus and Coach News	4
News From All Quarters	10
News Summary	2
Road Vehicle Industry	5
Shipping and Shipbuilding	20
Social and Personal	19

The Late Mr. Cecil Dandridge

IT must fall to few railwaymen to marry a princess; yet this was the fortunate lot of Mr. Cecil Gerald Graham Dandridge, formerly chief commercial manager of the Eastern Region, British Railways, who died last week in London. It was while a major in the Royal Engineers with the British Force in Russia at the close of the 1914-18 war that he befriended Princess Olga Galitzine, a refugee from the Bolsheviks, and managed to secure her passage on a destroyer which brought her to England and safety. Their wedding in 1924 was the happy outcome of this romantic exploit. His wife, to whom we offer our sincere condolences, survives him. That Dandridge was capable of such enterprise and initiative was surprising to those who detected in him a dilettantism which masked his true character and misled his early railway colleagues. This was because he was invariably modest and retiring but a good companion withal, blessed with a keen but quiet sense of humour and an ability quickly to size one up. His career began around 1906 in the general manager's office of the old Great Central, which had just moved from London Road, Manchester, to Marylebone Station. Even in those days Cecil had an air of taking life easily; nevertheless he succeeded in passing the company's higher grade examination and from then on he never looked back. He served throughout the war in the R.O.D. and finished as a district traffic superintendent on the Anatolian Railway. He was more a commercial than an operating man, and it was as a commercial officer that he was engaged on his somewhat tardy return from the army in 1920. He served the L.N.E.R. as a district passenger manager until 1928 when, surprisingly, he was made advertising manager, an appointment providing full scope for an artistic bent which raised the already high tone of L.N.E. advertising and led to the design of Gill Sans type for poster work. He became passenger manager, Southern Area, in 1944 and received the C.V.O. in 1948; since retirement five years ago his amiable and engaging presence had been sorely missed in places where transport men meet.

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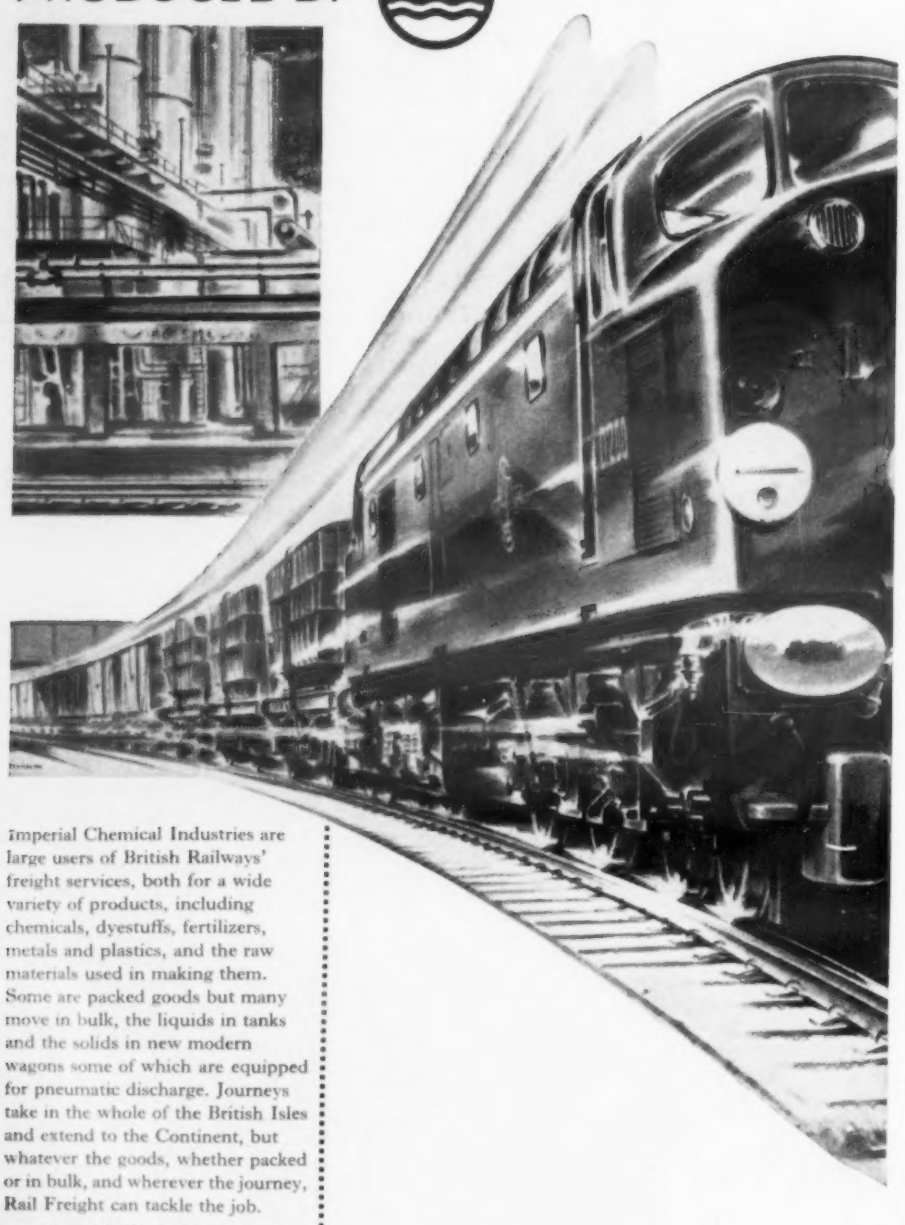

Imperial Chemical Industries are large users of British Railways' freight services, both for a wide variety of products, including chemicals, dyestuffs, fertilizers, metals and plastics, and the raw materials used in making them. Some are packed goods but many move in bulk, the liquids in tanks and the solids in new modern wagons some of which are equipped for pneumatic discharge. Journeys take in the whole of the British Isles and extend to the Continent, but whatever the goods, whether packed or in bulk, and wherever the journey, Rail Freight can tackle the job.

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The Editor is prepared to consider contributions offered for publication in MODERN TRANSPORT, but intending contributors should first study the length and style of articles appearing in the paper and satisfy themselves that the topic with which they propose to deal is relevant to editorial requirements.

Great Eastern Suburban

UPON its formation a little less than one hundred years ago the Great Eastern Railway Company found itself already provided with a certain amount of suburban business; its Loughton branch dated from 1856 and the North Woolwich line from 1847, while in the London and Blackwall line it leased one of the first urban rapid transit lines in the world, as it had opened to cable traction in 1840 and from the first provided a quarter-hourly service. The original route of the Cambridge (or Northern and Eastern) main line in 1840 was via Stratford and the first branch was that from Broxbourne to Hertford East which opened in 1843, when the Eastern Counties main line extended only to Colchester, and the Northern and Eastern only to Bishops Stortford. The line from what is now Angel Road to Enfield Town was completed six years later, but originally looked so unlike a money spinner that a light steam rail motor was designed for it. The newly-formed Great Eastern Railway was ambitious. It set about getting a terminus in the city instead of on the fringes at Shoreditch (now Bishopsgate goods station) and to build both a short cut to the Lea Valley line and to develop suburban business either side of it. In 1870 the Walthamstow branch was brought into operation from Lea Bridge, most of the trains merely connecting with Cambridge line services. This route was prolonged to Chingford in 1873 (short of its original destination at High Beach in the heart of Epping Forest) but had earlier been connected to the Bethnal Green — Hackney Downs — Clapton line, which was the cut-off to the roundabout Cambridge route via Stratford. From Hackney Downs another cut-off led to Lower Edmonton on the Enfield branch and this was completed in 1872. A loop from Lower Edmonton via Churchbury (now Southbury) to Cheshunt on the Cambridge line followed in 1891, but traffic remained thin until its closure in 1909.

Expansion at Low Fares

IN the meantime trains had been operated as far as Bishopsgate Low Level from November 4, 1872; the consummation of a city terminus at Liverpool Street came when platforms 1 to 10 were opened on February 2, 1874. This extension was not only costly because of its physical difficulty, but in return for the demolition of tenement property Parliament insisted on special services, at twopence return, for displaced workmen who went to live at Edmonton and Walthamstow. In the upshot the Great Eastern ran 23 twopenny trains daily at the opening of the 20th century, journeys from Enfield Town representing 21½ miles for the money. For certain specials each morning fortnightly packets of tickets at 3d. each were issued and half fares were general from stations on these lines up to 8 a.m. In addition an hourly service throughout the night was operated (beginning on June 21, 1897) from Liverpool Street to Walthamstow Wood Street. By 1894 another costly scheme had had to be carried out—the addition of platforms 11 to 18 at Liverpool Street to cope with the increasing traffic. In 1899 coaching stock 9 ft. wide was introduced so as to seat six passengers on each side of a compartment; subsequently the older stock was expanded laterally by an ingenious feat of coach-building to match it. The knee room and comfort standards were not especially remarkable and, indeed, it was only after 1911 that a bogie suburban coach programme was energetically put in hand.

Procrastination

NEVERTHELESS, by cheap fares, regular services and close attention to punctuality the railway succeeded in building an enormous business. The Great Eastern in 1913 carried 97 million passengers, 27 million of whom were at workmen's fares and in addition it issued 61,000 season tickets; a high proportion of this traffic was in the London area. Six years later there were 107 million suburban passengers alone. Owing to the low fares charged to the majority of peak hour users this business was scarcely remunerative and the course which might have appeared obvious, electrification, was not entertained by the company because of its additional capital cost. Indeed, as is recounted elsewhere in this issue, the threatened competition of tube railways was staved off by a tour de force with steam in 1903. By 1919, however, the threat came from trams and buses, so another expedient was adopted on the Enfield and Chingford lines. For £80,000 track and signal alterations were made that permitted 24 trains an hour to work over the two-track suburban line out of Liverpool Street—a two-minute service from platforms 1 to 4 with a four-minute pause at the end of each 10 minutes. The world's most intensive steam service—quickly known as the jazz service, since the lively mind of the late F. V. Russell had thought of coloured bands on coaches to distinguish their classes — was the more remarkable in view of the undersized 0-6-0 tank engines which worked most of it. Electrification was thus comfortably postponed and when plans were resumed after the London passenger pooling scheme had robbed road competition of its sting first attention was given to the Shenfield and Loughton lines, the latter receiving the eastern end of the Central Line tube service. Because of the 1939-45 war neither fructified until 1949.

A Welcome Addition

A HAPPY outcome of railway modernisation proposals is the electrification by the Eastern Region of the Enfield Town and Chingford lines in preference to waiting for long-promised new tube facilities. With them the Hertford East and Bishops Stortford services are turned over to electric traction and service is restored over the Southbury loop, on which, apart from a push-and-pull local between 1915 and 1919, regular suburban trains had not run since October 1, 1909. These outer suburban services are supplemented by diesel trains on the Lea Valley line, including a service at two-hourly intervals (with peak hour additions) from Cheshunt to Stratford, where it uses the Channelsea Curve as a loop terminal and makes valuable connections. Good connections are indeed a feature of the remodelled Cambridge line service. Parcels traffic has been concentrated and freight timings rearranged to suit the new conditions; as stated last week, only 5 per cent of Great Eastern Line passenger mileage is steam-hauled from November 21. New works for the 50-cycle electrification, which extends over 45 route-miles and 111 track-miles, include 13 miles of track blanketing, 20 miles of ballast cleaned, platform lengthening at 28 stations, and complete reconstruction at Broxbourne and Harlow New Town, with remodelling at Enfield Town and elsewhere. Signalling has been brought up-to-date and additional accommodation provided at Ilford for maintaining the rolling stock, for which new carriage washing plants are provided locally; the attractive new electric trains comprise 19 four-car outer-suburban sets and 52 three-coach sets for Enfield and Chingford services. Their high-performance schedules are a welcome addition to London's travel facilities.

NEWS SUMMARY

WITH the death of Viscount Stansgate and the consequent elevation to the peerage of Mr Anthony Wedgwood Benn, the Labour Party will lose its principal spokesman on transport in the House of Commons. Some authorities have suggested that Mr. Benn might still find a way out of the peerage he does not want by resigning his title.

Higher fares in the London area, due to increased bus and railway wages, are to begin on January 15, 1961. The 3d., 5d. and 6d. stages are not affected, but from 7d. to 1s. 11d. 1d. is to be added; 2s. to 2s. 9d. go up by 2d.; and progressively. The 2s. 9d. early morning fare is increased to 3s. (same as ordinary return) and notice is given that they will not be prolonged beyond the end of 1961, and will be abolished elsewhere from January 1 next. L.T.S. and railway day return fares are to be increased by small amounts and season tickets by 1s. in the £.

British European Airways hopes to operate Vickers Vanguards on some of its London—Paris flights from December 17. Their use will be on an ad hoc basis until April.

Cheaper fares on railway steamers to the Channel Islands are announced. The return fare from Weymouth to Jersey or Guernsey on the one-class service from next May will be £4 14s. 6d.—a reduction of 55s. on the present first-class and of 11s. on the second-class fare.

We regret to record the deaths of Sir John Thornycroft, K.B.E. (portrait and biography on page 11) who had played an active part in the commercial motor vehicle industry from its earliest days and continued to take a lively interest in his company's affairs right to the last, and Mr. C. G. G. Dandridge, who retired from the position of chief commercial manager, Eastern Region, in 1955 (biography on page 19; memoir on page 1).

GREAT EASTERN LINE

NORTH-EAST LONDON ELECTRIFICATION

Inauguration of Intensive Services

OFFICIAL inauguration of the Eastern Region Great Eastern Line North-East London suburban electrification took place on November 16 by Sir Brian Robertson, chairman of the British Transport Commission. The inaugural train ran from Liverpool Street to Bishops Stortford and back and gathered a number of civic dignitaries from feeder trains en route; on its return they were welcomed at Liverpool Street by Sir Bernard Waley-Cohen, Lord Mayor of London.

Work Involved

Work on the electrification was begun in the autumn of 1957 as part of the modernisation of British Railways and in the course of it 37 overbridges have been reconstructed, nine have been raised, 13 lengths of track have been lowered under bridges to give sufficient clearance for contact wires electrified at 6,250 or 25,000 volts, 30 underline bridges have been reconstructed and 80 others reconditioned. For this scheme three stations on the Southbury loop last used for passengers in 1919 have been reopened, new stations have been provided for Broxbourne and Harlow Town, while extensive alterations have taken place at Enfield Town and Bishops Stortford among others. No fewer than 52 platforms have been lengthened to accommodate nine-car Chingford trains and eight cars out as far as Broxbourne, where Hertford East and Bishops Stortford trains divide into two four-car sets. For the accelerated and intensified services there are 19 four-car (built at Doncaster) and 52 three-car (built at York) sets, the latter being intended for Enfield and Chingford operations.

The new stock will proceed to Ilford maintenance depot every five days for inspection and an acid wash, but cleaning facilities are provided at Chingford, Enfield Town and Hertford East for day-to-day washing. With the completion of this electrification there are 120 route-miles of Great Eastern line covered by electric services. Previous inaugurations were Liverpool Street—Shenfield, September 26, 1949 (full service from November 7); Shenfield—Chelmsford, June 11, 1956; Shenfield—Southend Victoria, December 31, 1956; and Colchester to Walton and Clacton, April 13, 1959. The last-mentioned section was the first 50-cycle 25 kV section of British Railways. The gap between Chelmsford and Colchester will be closed in 1962. Liverpool Street to Southend Victoria has already been converted from 1,500 volts direct current to 6,250 volts alternating current at 50 cycles and early in 1961 the Shenfield—Chelmsford section will be converted to 25,000-volt a.c. current. Each workday 1,080 trains arrive at Liverpool Street and they carry an average of 171,000 people, 131,000 of whom arrive in the peak periods.

Inaugural Luncheon

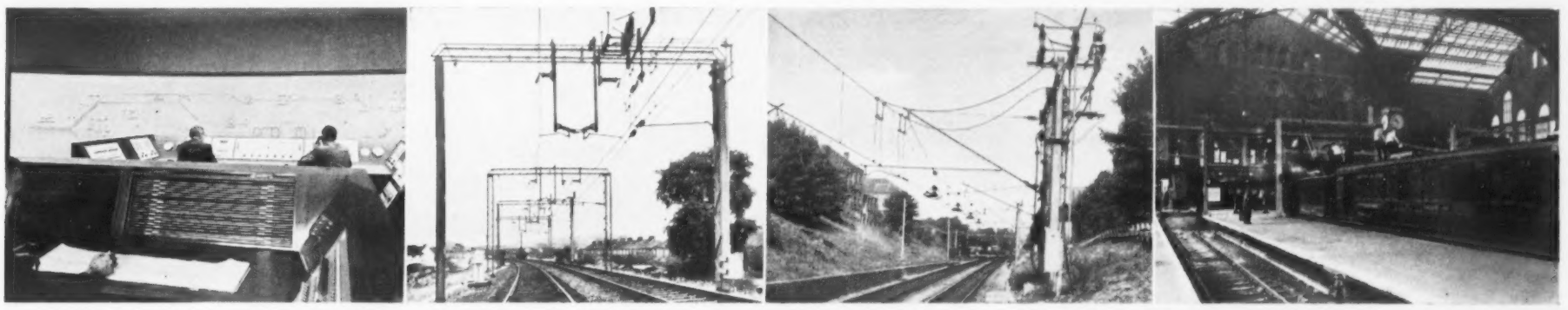
At the inaugural luncheon, presided over by Major-General G. N. Russell, chairman of the Eastern Area Board, he took the opportunity to express gratitude on that great day for the Great Eastern Line to the officers and staff, who were represented on the top table from general manager to motorman. They had been honoured by the Lord Mayor despite his heavy list of engagements and thanked the mayors and chairmen of local authorities who had joined the train. They welcomed Mr. Iain MacLeod as M.P. for Enfield West and hoped to carry his constituents on the new services. They also welcomed Sir Brian Robertson, the respected and much-loved chairman of the British Transport Commission, through whose efforts they had been able to produce a service which they hoped would be of great benefit to the citizens of London.

Sir Brian Robertson referred to the recent electric traction conference held by the B.T.C. and the manufacturers concerned, from which all the overseas visitors departed feeling they had participated in something worth while. The results of the Scottish electrification opened 10 days ago were already encouraging. That day it was the turn of the Great Eastern and although they were "inaugurating" a service it was, of course, already in partial operation. He congratulated the Great Eastern on an event which had passed almost unnoticed—the changeover to higher voltage. With the opening they brought to an end a frustrating period for the passengers and thanked them for their patience. The diesel or electric solution to motive power modernisation depended on the traffic density. Over 70 per cent of daily travellers were brought to the Metropolis by rail and the two problems were handling the traffic to give tolerable comfort and the fact that the vast equipment needed for the peak hour did not pay unless it was well used in off peak periods.

Transport Progress

Mr. Iain MacLeod, M.P., said that having 208 trains in lieu of 94 was splendid news for his constituency—he hoped it would lighten the Eastern Region postbag as well as his. As Secretary of State for the Colonies he welcomed transport progress, because one of the best measures of development was a highly developed transport system and as we ceased to govern formerly dependent countries our help to them must increasingly be in the way of technical aid. It was good for humanity and good business as well. We were profoundly rich in know-how which we could share. A magnificent achievement had been inaugurated in London that day and they could lift their eyes from suburban electrification and see immense benefits in the realm of railways.

Inaugural special from Bishops Stortford is greeted by the Lord Mayor of London. Left to right: Motorman H. J. Bateman, Major-General G. N. Russell, Sir Bernard Waley-Cohen, Sir Brian Robertson, and Mr. H. C. Johnson



Romford electrical control room from chief controller's desk; carrier wire neutral section at changeover from 6,250 volts to 25,000 volts on Southbury Loop near Cheshunt Junction; insulator type neutral section between Stoke Newington and Manor Road sidings; and, right, fixing conductor wire on No. 4 platform at Liverpool Street

Route setting panel in Hackney Downs signalbox; the new ticket office at Broxbourne Station; and, right, installers working on colour-light signal equipment at Bishops Stortford

Cambridge Main Line

The Hertford East and Bishops Stortford trains run combined to Broxbourne at 20-min. intervals during peak hours and half-hourly in off-peak times. Connecting trains are available at Cheshunt for the Lea Valley line and at St. Margaret's for the Buntingford branch. For Bishops Stortford there are, in addition, at the height of the morning peak, three diesel multiple-unit trains to Liverpool Street, calling only at Harlow Town, with a corresponding return service for the evening peak period. Bishops Stortford will also be served by main-line trains which will run nonstop to Liverpool Street. Expresses reach Bishops Stortford in 39 mins. or so and the Harlow Town and Bishops Stortford extras take 41 min.

Diesel-hauled main line trains between Liverpool Street and Cambridge will run at approximately 20-min. intervals during peak periods, making a first stop at Bishops Stortford. The peak-hour service on the non-electrified Lea Valley line will be three diesel trains an hour between Broxbourne and Liverpool Street. In off-peak periods an hourly service will run between Cheshunt and Liverpool Street. In addition, there will be certain diesel trains running between Cheshunt and Stratford. With electric services terminating at Bishops Stortford, stations north of this point will be served mainly by connecting diesel trains.

Rolling Stock

All the multiple-unit electric stock for use on the new routes was constructed in British Railways' workshops. The 52 three-car units, built at York for service on the densely-populated Enfield Town and Chingford lines, consist of a battery driving trailer, motor coach (with guard's van) and driving trailer. The electrical equipment on these trains is specially designed for a high frequency of operation—a special characteristic of inner suburban services. A feature of the Enfield Town line is that the average distance between stations is only three-quarters of a mile. The length of each three-car unit is 199 ft. 6 in. over buffers and seats are provided for 272 second-class passengers in open saloons.

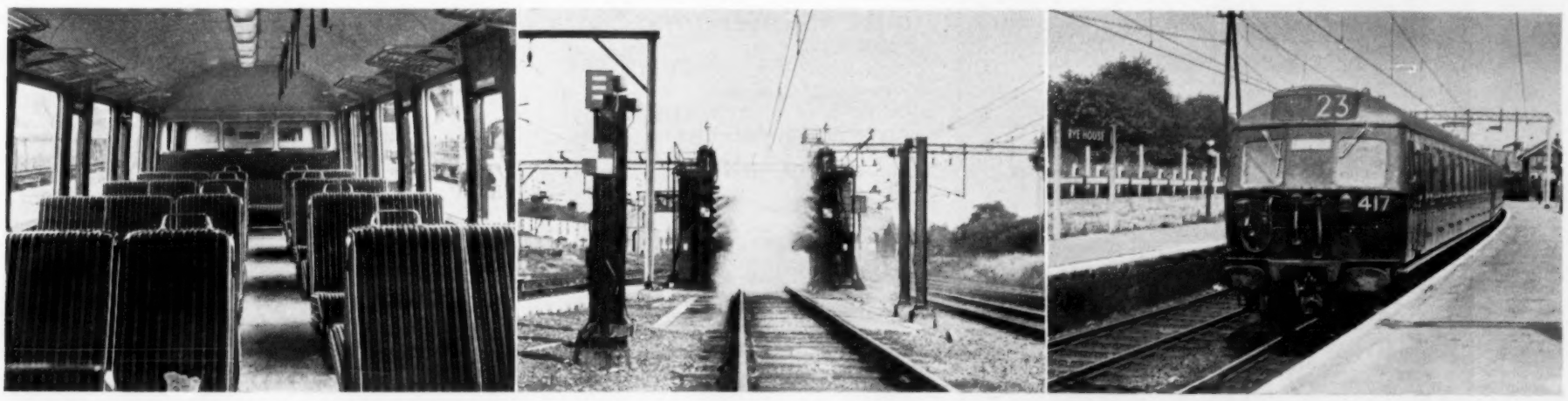
The 19 four-car sets were built at Doncaster and are similar to the three-coach units, but with the addition of a trailer composite coach. This stock will operate on the outer suburban services between Liverpool Street and Hertford East or Bishops Stortford. The route includes an 8¾-mile non-stop section between London and Lower Edmonton. As the timetable demands trains to run for considerable periods near their maximum service speed, a high standard of performance is required from the electrical equipment fitted in the units. The four-car trains are 265 ft. 8½ in. long and have seating accommodation for 19 first-class passengers in compartments and 344 second-class passengers, partly in open saloons, the remainder in compartments. Both the three and four-car units have a streamlined cab end; the former have large windows along the sides of the vehicles. Toilet facilities are provided on the outer suburban sets.

The bogies are fitted with knife-edge suspension to the bolsters carrying the spring gear to ensure, as far as possible, free and smooth riding qualities. Liners of asbestos material bonded with synthetic resins are fitted to the bogies for sound insulation purposes, together with special rubber reinforcing springs. The floor, sides and roof of all coach bodies are insulated against noise and extremes of heat or cold. Buckeye couplings are fitted. Motor coaches have two motor bogies each with two 200-h.p. motors.

Principal operating data for the three- and four-coach units with all seats occupied (16 passengers taken at 1 ton), a line voltage of 22.5 kV, 100 per cent secondary tappings and half-worn wheels, are tabulated on page 18.

Power Circuits

Current is fed from the pantograph through an air blast circuit breaker to the voltage changeover switch, which connects four sections of the transformer primary in series for 25-kV operation and in parallel for 6.25-kV operation. The return current is fed from the transformer to the wheels through brushes on each axle of the motor coach. The transformer secondary supplies two bridge mercury arc rectifier circuits, each feeding two traction motors in series. An equalising connection between the mid-points of each pair of motors detects the rise in voltage on a motor which develops wheel slip; this actuates relays and thus assists in the recovery of adhesion.



Chingford and Enfield multiple-unit stock—centre gangway open second; carriage washing machine at Chingford showing automatic electric eye equipment on posts in foreground; and, right, one of the new multiple-unit trains engaged in trial running at Rye House Station

It is estimated that receipts on the newly electrified line will double themselves within a few years. Takings on other electrified services from Liverpool Street have increased 2¼ times in 10 years as a result of increased traffic, in some cases far beyond the original estimates.

New Timetable

From November 21 there are on the Chingford line nine trains an hour during peak periods and six an hour in the off-peak, with fast and limited-stop trains which bring the overall time down to 22 min. Connection will be made with the Lea Valley line at Clapton, while Hackney Downs will be the interchange point for the Enfield Town, Hertford East and Bishops Stortford lines. To Enfield Town there are six trains an hour throughout the day including fast limited-stop trains in

The motor voltage is controlled by tapping switches on the transformer secondary, using two contacts per tap in conjunction with series resistances and a centre tapped choke. By these means 20 steps are provided from nine taps, two of these being running steps with no series resistance in circuit. Two further steps are provided by motor field weakening, of which the second is a running step. The motor field is permanently diverted for smoothing purposes, and the final step is obtained by a tapping on the field in conjunction with a proportionate tapping on the smoothing divert. The earth connection in the motor circuit is at the mid-point of the transformer secondary, thus limiting the potential to earth of all parts of this circuit to a maximum of half the full secondary voltage.

(*Continued on page* 18)

LORRY—BUS—COACH

Norcros Group Enters Haulage

A NEW financial group has entered the haulage field by buying Harold Wood and Sons, Limited, the bulk liquid transport contractor, of Heckmondwike, said to run a fleet of more than 300 vehicles, with a total staff of 480. Norcros, Limited, an industrial holding company, of 129 Kingsway, London, W.C.2, is paying £720,000 for the business, to be satisfied in cash and shares. A 90 per cent interest is to be purchased for £219,150 in cash and 217,800 6½ per cent preference and 120,600 ordinary shares. The remaining 10 per cent interest is held by a minor, but subject to the necessary approval, it will be acquired for £24,350 in cash and 24,200 preference and 13,400 ordinary shares of Norcros.

It is stated that the current year's profits of the Harold Wood group should not differ greatly from the past year, in which they were £213,254. The group has works and shops at Heckmondwike and at Basildon, Essex, where a subsidiary, Commercial Vehicle Repairs (Essex), Limited, operates. Plans are in hand for considerable extensions. Mr. Wood, who is now 63, developed the firm from a general haulage business into its present specialist nature. Four years ago Spen Coach Builders was formed for repair work and vehicle building, and two years later a subsidiary, Commercial Vehicle Repairs, was formed at Basildon New Town. Mr. Wood has entered into a seven-year agreement as managing director and Mr. A. Fraser, general manager, has entered into a similar agreement.

Pink Zone May Assist Deliveries

DETAILS of arrangements in the enlarged Christmas traffic "pink zone" in Central London, as they affect firms with commercial vehicles loading and unloading in the area have gone out to members of the Traders' Road Transport Association. There will be no complete loading bans on considerable lengths of street as last year, but intersection loading bans similar to those already in force in the parking meter zones will be extended to other parts of the central zone at important or difficult traffic junctions.

Also, ordinary "no waiting" restrictions will be applied to lengths of street adjoining these new intersection bans in order to provide kerb space clear of parking next to them for loading and unloading. This is supremely important, the T.R.T.A. feels, because it is the availability of these clear kerb spaces in the parking meter zones which makes the intersection bans acceptable and workable. From the point of view of loading and unloading, therefore, much will depend on the extent to which adjoining lengths of street are kept free of illicit parking. Except at parking meters, no parking will be allowed between 8.30 a.m. and 10.30 p.m. on weekdays in Oxford Street, Regent Street, New Bond Street, Old Bond Street and Piccadilly, as far west as Old Bond Street, and in the first 100 yards of any street leading off them, and this should assist loading and unloading. The T.R.T.A. has again been asked to request all members delivering into central shopping areas to do all possible to complete such deliveries before 1 p.m. Conditions, particularly from pedestrian traffic, become so bad after that time that it is in members' own interests to do this. A number of the larger stores will again be able to make arrangements to receive early deliveries.

A cloud of steam envelops the engine of an Army R-type Bedford as it traverses a watersplash in the Army Rough Riding Television Competition near Bordon. The right-hand scene is what is described as a "testing corner"

Baillieston Bus Garage

THE new Scottish Omnibuses' £90,000 garage at Baillieston just outside Glasgow went into service on November 14. The need for the new depot arose through recent developments in the Glasgow area, which resulted in a major increase in the number of vehicles operated from Airdrie depot. Scottish Omnibuses acquired the business of Lowland Motorways, Limited, in this area. There was needed additional accommodation for vehicles and also a better control organisation. These features, together with a substantial reduction in light mileage, have been achieved by the building of the new depot at Baillieston, just outside the Glasgow city boundary, thus enabling the fleet to be split up between the two depots with approximately 90 buses in each. Apart from some centralisation of clerical work at Airdrie, the new Baillieston depot is entirely self-contained.

Express Frequencies Stepped Up

EXPRESS bus services operated by the Northern General Transport Co., Limited, between Newcastle, Chester-le-Street and Durham, and between Newcastle and South Shields are to operate half-hourly between 10 a.m. and 6 p.m. on Saturdays, instead of hourly as hitherto.

Integration of Municipal Departments

AN efficiency consultants' recommendation that the cleansing department be integrated with the transport department was rejected by last week's meeting of Blackpool Town Council. The recommendation was one of two major proposals rejected. The consultants, who have been examining administrative procedures within the corporation, had estimated that there would be an annual saving of over £7,000 if the cleansing department were merged with transport, and lighting and electrical services with the borough surveyor's department. While rejecting full integration of cleansing and transport, however, a special subcommittee thought that arrangements for the maintenance of the cleansing department's vehicles in the transport department should be considered. This would determine, it was stated, whether savings could be made or efficiency improved.

Mobile Shop Complaint

SOME Leicester retailers set up mobile shops outside their permanent premises to enable them to sell goods which the law prevents them from selling indoors. Such is the claim in the annual report just published of Leicester Markets Committee, which criticises present legislation as being "unrealistic and out of keeping with modern trade practice."

Does Robbery Need a Licence?

JUST for the record—the Transport Tribunal has decided that a thief who used a C-licensed vehicle to haul off the proceeds of a shop break-in shall not forfeit the licence on the score that the vehicle was used for "hire or reward." He gained nothing because he was arrested. Mobile operators in the underworld will, however, be disappointed that the Tribunal did not lay down what class of licence, if indeed any, is required for a haul of this nature.

Light Penalty for Change of Base

AN operator, John McRae (Transport), Limited, which moved a vehicle from its base at Prudhoe-on-Tyne to Dundee and only subsequently applied for a licence for the new base has had a two-month suspension reduced by the Transport Tribunal to one of 24 hours. The Dundee application was unsuccessful but, says the Tribunal decision, from the date it was put in the operator could no longer be regarded as sinning. Therefore the vehicle is to be reinstated on the Prudhoe licence from which it was to be suspended, a nominal suspension of 24 hours being imposed to purge the offence.

Still Scope for Preston—Larne Service

THERE is still hope for a container service between Preston and Dublin, according to Mr. J. F. Jolley, traffic manager of the Irish Continental Ferry Service. He said last week: "Negotiations are still going on, and we hope that one day such a service will come into operation." Mr. Jolley said the Preston—Larne vehicle-ferry service was "snowballing continuously. People say the service will some day reach saturation, but I can't see that happening." He was commenting on the news that the *Bardic Ferry*, which used to operate on the run before being transferred to the Tilbury—Antwerp—Rotterdam service, was returning to Preston in the New Year. It is replacing one of the original tank-landing craft which pioneered the ferry service, and which is coming out of service. The *Bardic Ferry* is bigger, having a capacity of 80 vehicles as against one of 60 for the original vessels. An even larger vessel is now being built for the Atlantic Steam Navigation Co., Limited, on the Clyde. It will carry about 100 vehicles, and will go on the Continental run early next year.

Let-off on Hours Charges

CHARGES of permitting a driver to exceed five and a half hours' continuous driving, and to exceed an aggregate of eleven hours daily were admitted by D. and D. Transport, Dundee, at Dundee Sheriff Court. Mr. J. W. Laverock, solicitor, said he had no alternative but to plead guilty. They were in a cleft stick. His clients were very particular about the regulations, and their drivers were warned as to what they could do and what they could not do. A route was mapped out for them, accommodation booked, and they were given money to pay for their night's board and lodgings. In this case the driver did not avail himself of these opportunities, and rather than take up the accommodation he pocketed the money. His records showed the excesses, but nothing could be done about it, it was too late. Employers were bound by these records which they themselves did not keep. Mr. Laverock said his clients had gone even further by providing clocks in their lorries so that the men would know exactly how they stood. Sheriff Inglis said he did not see what more they could do, and admonished them.

Coach Drinks in Bill

PASSENGERS on regular long-distance express road coach services will be able to order a glass of beer or a gin-and-tonic during their journey if Mr. H. Bottomley, general manager of Ribble Motor Services, Limited, Britain's largest operator of express coach services, can secure Parliamentary approval for an amendment to the new Licensing Bill. No legal machinery exists at the present time whereby authority can be granted for the sale of alcoholic drinks on road passenger vehicles in Britain. A plea has been submitted by Mr. Bottomley to Mr. Dennis Vosper, Minister of State for Home Affairs, for an amendment to the Bill, now before Parliament, which would "enable excise licences to be issued authorising the sale of alcoholic drinks for consumption by passengers on public service vehicles which are suitably equipped for the sale of refreshments." Ribble and its subsidiary, W. C. Standerwick, last year started serving hot and cold drinks and light refreshments on board 25 luxury Leyland Atlantean Gay Hostess double-deck coaches, which are equipped with modern serveries, and manned by stewards or stewardesses.

Mr. Bottomley recalls that it is permissible to serve drink on board railway trains, inland-operating vessels such as pleasure craft in the Lake District, river craft in Merseyside, coastal steamers and the like, and passenger aircraft operating between one place and another in the United Kingdom. It is unfair to continue to deny coach passengers the same privilege of purchasing a drink during their journey.

Bus and Coach Developments

Charles W. Banfield, Limited, applies for the London—Great Yarmouth coach service of Grey Coaches, Limited.

Reading Corporation proposes a new service from the Stations to Maiden Erleigh (Junction of Silverdale Road and Finch Road) via London Road, Erleigh Road, Wokingham Road, Wilderness Road and Betchworth Avenue.

Percival Brothers (Coaches), Limited, Richmond, Yorks, seeks the licences of Sunter Brothers, Northallerton.

The Southern Railway Dramatic Society, whose producer is Mrs. Hope Slessor, this week staged a delightful presentation of Nöel Coward's "This Happy Breed" which was enthusiastically received at the Scala Theatre. Mr. H. C. Lang, chairman of the Society, presented a radio set to Mr. E. H. Simons, founder and secretary, who is retiring.

Photo by courtesy of British Railways (London Midland Region)

Investigation into track-spraying techniques has led to the development of two prototype sprayers. Completely modern in conception, and designed with the needs of today's diesel electric railways in mind, this equipment brings chemical weed control out of the steam age.

Registered Trade Mark of J. R. Geigy S.A. Basle Switzerland

WEEDEX

cuts maintenance costs on railways

An intensive research programme carried out at the Chesterford Park research station on British Railways' weed problems, has proved Weedex to be the cheapest, safest and surest way of maintaining weed-free tracks and installations.
An annual treatment is an outstanding investment.

Weedex is sold overseas as Simazine 50W

FISONS PEST CONTROL

ROAD VEHICLE INDUSTRY

Stainless Steel Engine

THE remarkable specific power of 1 h.p. per lb. is claimed for a new U.S. automotive petrol engine that had a first showing at the recent American Society of Body Engineers Technical Convention in Detroit. Designed by Mr. Lloyd Taylor and produced by Tyce Engineering Corporation, Chula Vista, California, the twin-overhead-camshaft four-cylinder engine block assembly is fabricated entirely of brazed stainless steel sheet and tube, including cylinder liners, combustion chambers, water jackets, inlet and exhaust ports and sparking plug tubes. Use of stainless steel is said to eliminate corrosion worries and troublesome hot spots and this and elimination of a cylinder head gasket in the design permits operation on normal fuels at compression ratios of up to 14 to 1. The new engine is being produced in four displacement sizes from 91 to 135 cu. in. (about 1½ to 2¼ litres) with a common bore of 3½ in. and a dry weight, less starter and generator, of about 175 lb. All develop maximum power at 6,500 r.p.m., the 2¼-litre unit having an output of 175 b.h.p.

Film on Capasco Friction Pads

RESEARCH and testing behind the production of Capasco disc-brake friction pads is shown in a new film made by World-Wide Pictures for the Cape Asbestos Co., Limited. Scenes taken in the company's central laboratory at Barking show various designs of friction pads being tested to red-hot temperatures on a dynamometer. Outside shots show how easily and quickly the friction pads can be changed on a vehicle. Entitled *Disc Age*, the film runs for 5 min. and forms an appendix to *Brake Stop*, a Capasco film about general brake lining research. The films are available free on loan from the Cape Asbestos Co., Limited, 114 and 116 Park Street, London, W.1.

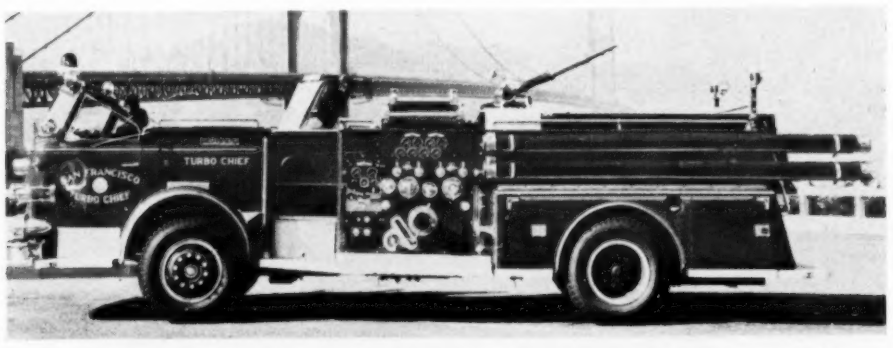
New structural plastics front end for Leyland double-deckers (a contract report appears on page 20) contrasted with normal steel structure on left

Pirelli Stock in South East

IMPROVED service for Pirelli distributors in the south-eastern part of England is provided by an additional stocking point at Maidstone, Kent, under the company's southern division. The Maidstone address is: Pirelli, Limited, c/o C.Y.B. Fats, Limited, Lucerne Street Garages. The telephone number is Maidstone 2578.

Gas Turbine-Powered Fire Engine

WHAT is probably the world's first gas turbine-powered fire engine has recently been put into service by the San Francisco Fire Department. Built by American LaFrance Corporation, the vehicle is powered by a Boeing 330-s.h.p. gas turbine, which also drives the 1,000-g.p.m. fire pump. The gas turbine exhaust stack, made of stainless steel, can be seen in the accompanying illustration mounted nearly vertically behind the driver. The vehicle, which weighs 31,500 lb., is said to have excellent starting, acceleration and hill-climbing capabilities, going from a cold-engine start to 50 m.p.h. in 45 sec. and from an engine-idling start to 45 m.p.h. in 26 sec. Seattle Fire Department has ordered a similar vehicle equipped with 100-ft. escape ladder.



LaFrance fire-pump vehicle powered by Boeing 330-s.h.p. gas turbine in service with San Francisco Fire Department

New Mural Texturide Designs

FIVE new designs in a variety of colours have been added to the Mural Texturide range of vynil-coated fabrics by Arlington Plastics Development, Limited, Eastern Industrial Estate, Harlow, Essex. Patterns of these latest materials are available on request.

Improved Lubricating Oil Treatment

AN improved process which enables lubricating oils to be manufactured without producing a solid waste by-product that requires disposal has been developed by scientists at the British Petroleum group research centre at Sunbury-on-Thames. The first plant to use the process, named Ferrofining, is to be built at the Dunkirk Refinery of B.P.'s French associate company. The essential feature of Ferrofining is a new catalyst. This enables hydrotreating to be used as a finishing process not only for solvent refined lubricants, but also for straight distillate lubricants. Extensive tests have shown that Ferrofining produces lubricants with an excellent resistance to oxidation. They have been formulated successfully into petrol and diesel engine oils with the same performance as those treated by conventional clay methods.

Difficulties with Door Locks

TIMELY advice issued by Wilmot Breeden, Limited, on care and maintenance of vehicle door and boot-lid locks, particularly during winter months, says that many people are under the mistaken impression that such locks should not be oiled. Lack of lubricant in fact permits corrosion of moving parts and results in the key becoming difficult to insert and operate. Correct treatment is to give a few drops of light machine oil once a month, distributed by applying it to the key. A frozen lock, says the advice, can usually be freed by warming the key in the flame of a match or lighter.

A.E.C. Welcomes Larger Vehicles

REPLYING to a question in the House on Wednesday, the Minister of Transport said he would circulate to interested organisations for comment a proposal to increase the maximum permitted width of public service vehicles to 8 ft. 2½ in. and maximum length to 36 ft. as a result of a request from manufacturers and operators. Commenting on the Minister's remark, Mr. E. R Hollands, director and general manager of A.E.C. (Sales), Limited, said: "We have supported operators who have for long realised that the 30-ft. vehicle is inadequate and out-dated for present-day operation in Britain, particularly now that motorway travel is extending all over the country. We would welcome legislation authorising the use of longer coaches in Britain, because it would give A.E.C. the opportunity to line up home with export production. This, obviously, must ease production problems. There are, of course," continued Mr. Hollands, "many A.E.C.s of this length of 36 ft. and over already operating throughout the world."

Filon Brochure

VARIOUS grades and types of Filon translucent plastics sheeting are described in a new brochure published by the manufacturer, B.I.P. Reinforced Products, Limited, Streetly Works, Sutton Coldfield. Numerous applications in transport vehicles and buildings are described and illustrated and prices are given.

Acheson Dispersions in Transport

INTERESTING uses for Emralon, the Acheson resin-bonded ptfe dispersions, are featured in the new issue of *Prospects*, published by Acheson Colloids, Limited, P.O. Box 12, Prince Rock, Plymouth. The article explains how Emralon cured troubles arising from the sticking of rubber to conveyor belts in the Buffalo plant of the Dunlop Tire and Rubber Corporation. The Dunlop organisation is also the subject of another article dealing with the development and testing of high-speed tyres at Fort Dunlop. Among other subjects covered are the dry film lubrication of Rover gas turbine auxiliary aircraft power units.

Desert Tests for Giant Scammell

DESCRIBED as the biggest thing that ever left Watford, a £20,000 articulated lorry has just been shipped by Scammell Lorries, Limited, to Libya for a series of tests and demonstrations before being delivered to a trading company in the area. The vehicle is a six-by-six Super Constructor tractor, powered by a 250-h.p. diesel engine and Self-Changing Gears eight-speed semi-automatic transmission, and bogie semi-trailer giving an overall length of 57 ft. The vehicle is equipped with extra-large tyres for operation over soft sand, a tubular front bumper forming an 8-gal. water tank and a winch for trailer loading. Carrying capacity is 45 tons. The intention, according to Mr. W. Blades, Scammell export sales manager, is to compete with American vehicles already operating in Libya in an endeavour to show that British vehicles are as good if not better than anything in the world.

Work Study on the Forecourt

ON December 6, at the Windermere Hotel, South Kenton, the Harrow and Wembley Productivity Association has organised an evening meeting dealing with work study in a garage forecourt. The work study unit of the British Productivity Council, working with a similar group from Shell-Mex and B.P., Limited, will demonstrate how to raise the efficiency of a service station. There will be visual aids, a film shot on an actual forecourt and talks by specialists in this field. Tickets at 10s. 6d. each are obtainable from Mr. A. G. Sells, Industrial Engineering Department, Kodak, Limited, Harrow, Middlesex.

A TIPPER YOU CAN RELY ON

THE TIP—Buy THORNYCROFT

THE TIPPER—A Thornycroft "TRUSTY" maximum load 8-wheeler with 40 cu. yd. tipping body and glass fibre cab

The "TRUSTY" maximum load 4-, 6- and 8-wheelers are chosen for their performance and low running costs by operators with heavy loads to carry. There is a choice of three rear axle drives and other features include a powerful THORNYCROFT designed and built six-cylinder oil engine, all wheel air pressure brakes and first class driving comfort. A range of works designed and built bodies and cabs is available. Full particulars of the "Trusty" and any other of our range of chassis gladly supplied on request.

Shown above are two of the "TRUSTY's" operated by Tippers (Rochester) Ltd.; Bowyer Bros. (Congleton) Ltd., built the bodies and cabs

THORNYCROFT
"TRUSTY"
IT'S A TIPPER WORTH HAVING

TRANSPORT EQUIPMENT (THORNYCROFT) LIMITED, BASINGSTOKE, HANTS. Basingstoke 1200

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43-SEATER DOUBLE ENTRANCE MARSHALL-MULLINER METAL-FRAMED SINGLE-DECK OMNIBUS BODY ON A LEYLAND TIGER CUB P.S.U.C.1.5-UF CHASSIS

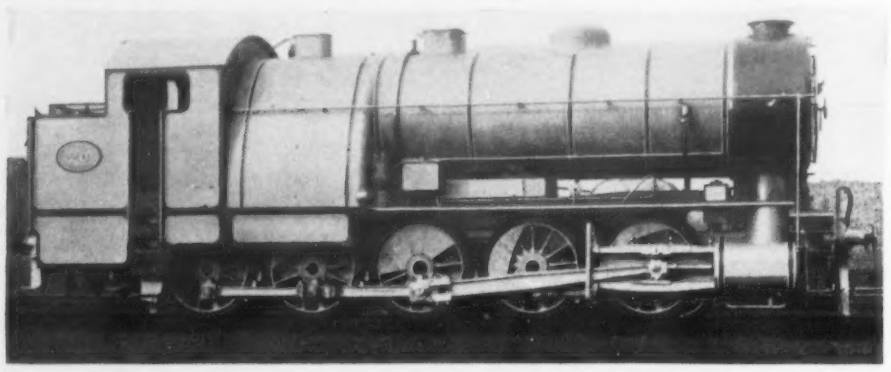
ENQUIRIES TO MARSHALL-MULLINER BUSES
AIRPORT WORKS – CAMBRIDGE

GREAT EASTERN LINE

A GLANCE BACKWARD

Previous Schemes for Coping with North-East London Traffic

INAUGURATION of the Great Eastern Line electric suburban service between Liverpool Street, Chingford and Enfield Town brings its reminder that 60 years ago the then Great Eastern Railway was threatened with electric railway competition to and from the north-eastern suburbs of London. The success of the Central London tube, opened in 1900, had produced a whole crop of new tube proposals, and among them two affecting the G.E.R., one, the City and North East Suburban, from Cornhill to Leyton, Walthamstow and Waltham Abbey, and the other, the North East London, from Mansion House to Tottenham, with a branch from Stoke Newington to Walthamstow and Leyton. It was this menace that caused the Great Eastern directorate to commission James Holden, its locomotive superintendent, to design a steam locomotive capable of the same rate of acceleration as that developed by electric locomotives at that time; the aim was 30 m.p.h. in 30 sec. from a standing start with a 300-ton train.



The Great Eastern 0-10-0 tank engine No. 20, built at Stratford in 1903 for comparable acceleration to electric trains and usually referred to as the "Decapod"

Genesis of G.E. 0-10-0 Tank

Such was the genesis of Holden's famous "Decapod" tank. The brilliance that went into the design of this unique machine, in which Fred V. Russell played an important part, especially in view of the severe limitations placed on the designer by G.E.R. loading gauge and weight restrictions, is not perhaps fully realised. One very unusual feature was the connecting-rod of the inside cylinder, which in order to be of sufficient length drove the second coupled axle; it was forked in such a way as completely to enclose the leading coupled axle, the latter being cranked so that it might synchronise with the up-and-down movement of the rod. Three cylinders, a 5 ft. 3 in. diameter parallel boiler, a wide firebox with a grate area of 42 sq. ft., and 200 lb. pressure, were all unprecedented in Great Britain practice; while 10-coupled wheels for a tank engine set an entirely new standard in Great Britain. A special plant was laid down near Chadwell Heath to test the acceleration, and after some teething troubles No. 20 triumphantly carried out its allotted task, and even more.

For it was an 18-coach train of 335 tons gross weight that the "Decapod" accelerated to 30 m.p.h. in slightly under 39 sec. from a standing start, compared with the 20 m.p.h. that could be attained 30 sec. after starting by the G.E.R. tank engines of the period, and with no more than 240 tons. The upshot was the defeat of both Bills; and though a similar Bill, presented to Parliament in 1905, did get passed into law, its promoters failed to get public support, and the powers lapsed. At that time the expense of strengthening the tracks sufficiently to carry a class of locomotives of the "Decapod's" weight did not seem justified and, after a short life in a much rebuilt form as an 0-8-0 freight engine, No. 20 was scrapped in 1913. But it had provided a relatively cheap solution of a formidable threat.

A Recurring Problem

Twenty years later the problem of carrying workers from the dormitory of North East London into Liverpool Street, and taking them back again at night, had become considerably more serious. At the maximum peak periods trains of 15 four-wheel vehicles were carrying from 1,200 to 1,400 passengers over parts of their journeys. Before the outbreak of war in 1914 the Great Eastern Railway had secured for its general manager Mr. Henry W. Thornton, of the Long Island Railway in the U.S.A., with considerable experience of electric operation; but not until after the end of the 1914-18 war could anything be done. No time was then lost in devoting intensive research to the problem.

Electrification of the lines from Liverpool Street to Enfield Town and Chingford was obviously the solution to be desired, but as it would have cost some £3 million to electrify the Enfield line alone (and probably at least £5 million if the Chingford line were included), the Great Eastern management could see little hope of raising any such sum on favourable terms in view of the intense bus and tram competition in the days before London Transport. It was this dilemma that produced the most astonishing achievement with steam haulage that railway history has even known. Other electric suburban services in the country were first studied in order to see what proportion of the improvements that they had brought about could be attributed to causes other than the electrification itself, and which could be applied equally to steam haulage, such as signalling, elimination of conflicting train movements, and so on. The study was carried out with stop-watch thoroughness, and its findings were implemented with praiseworthy rapidity.

A Scheme with Steam

The barriers to Platforms 1-4 at Liverpool Street, used by the Chingford and Enfield trains, were moved back, to give passengers by incoming trains a chance to make their way out through a number of gates, instead of one pair only; separate engine docks were laid in for each platform line, so that engines following departing trains out would not foul any other platform line; similar improvements were made at the suburban terminals; additional outer home and advanced starting signals were provided and rail contacts in connection with the Sykes lock-and-block signalling were moved as necessary in order to provide for a minimum headway between trains; and all this preparatory work was carried out at a total cost of £80,000 instead of the millions that would have been needed for electrification. The result was that it became possible to expand what already might have been regarded as a pretty intensive peak-hour service by no less than 50 per cent and even more.

When the new service came into operation, on July 12, 1920, during the peak hours steam-hauled 16-coach trains, each with seating for 848 passengers, began to follow one another at 2½-min. intervals between Liverpool Street and Bethnal Green, which meant 20,350 seats per hour, or 340 seats each minute, passing over the same line of metals. What is more, the bulk of this strenuous task was being shouldered by Holden's small 0-6-0 tank engines, weighing slightly less than 40 tons apiece! So far from their being any breakdown of the ambitious plan due to insufficient power, two months after its introduction there came a Saturday on which the entire series of trains from 12.10 to 2.30 p.m. started out of Liverpool Street dead on time, apart from one which was 1 min. late and three ½-min. late, and day after day the record of punctuality was exemplary.

During the peak hours 12 trains every hour were running from Liverpool Street to the Chingford line, three of them serving the three Walthamstow stations only; six to Enfield Town; and two to Palace Gates; also Hertford and Cambridge line trains had to be fitted in as far as Clapton Junction. And whereas the overall times at these peak periods were 33½ min. to Chingford and 37 min. to Enfield Town, at the off-peak hours, when the trains were cut to six coaches and acceleration was increased by a staggered system of stops, the times came down to 27½-30 min. to Enfield and 25½-28 min. to Chingford, with trains at 10-min. intervals over both lines.

This was very little short of the speed of the new electric service of 1960, though passengers to and from these north eastern suburbs now travel in far greater comfort than ever previously. Nevertheless the memory of the former Great Eastern Railway deserves a salute for its solution, even if temporary, of a pressing problem which for its economy coupled with its amazing addition to travel facilities has probably been without a parallel with steam haulage. Forty years later it is the Great Eastern Line which is in the happy position of bringing its predecessor's enterprise to full fruition.

★

REMOTE CONTROL AND SURVEILLANCE

Mullard Transistorised System

TRANSISTORISED equipment for the remote control and surveillance of industrial plant and installations that are designed to function automatically without direct supervision has been introduced by Mullard Equipment, Limited. Typical applications are in the public supply industries, the oil industry and railway signalling.

The new system, which can be built to users' specific requirements, gives facilities for remote control, remote indication and telemetering. It has been designed to operate over standard 120 c.p.s. (50-baud) amplitude or frequency-modulated voice-frequency telegraph channels, which are freely available for renting at economic rates. Suitable existing facilities, including v.f.t. systems of up to 24 channels, can also be used. The system can be supplied with or without line filters for "splitting-off" part of a telephone circuit and it can be modified to operate over 200-baud channels.

Fast and Continuous

Transmission from a remote controlled station is fast and continuous giving at the control an up-to-the-second picture of the vital measurements, actuating devices and so on. Over a single standard telegraph channel the system provides up to 150 remote control signals from the master station to the controlled points; in the reverse direction up to 156 remote indication signals or 12 telemetering channels, or combinations of both, are available. Additional telegraph channels multiply the number of facilities available.

For reliability, compactness and low power consumption, the system is largely transistorised. For flexibility in construction and easier maintenance, all the repeated circuits are assembled on plug-in printed wiring boards mounted in plug-in boxes. The boxes are sealed to ensure reliable service in tropical climates.

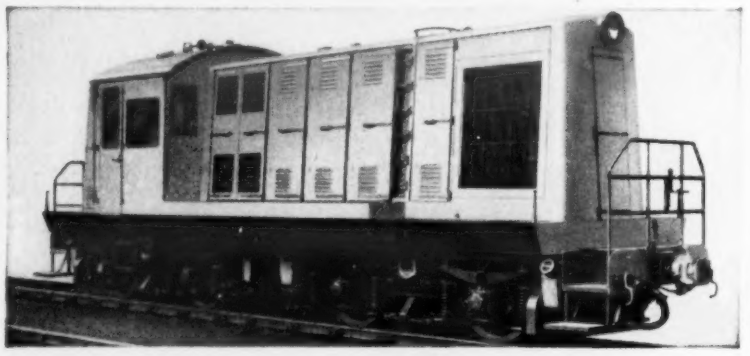
COMMONWEALTH RAILWAYS OF AUSTRALIA

950 H.P. Diesel-Electric Locomotive (10 Ton Axle Load)

In collaboration with Sulzer Bros. (London) Ltd. and Crompton Parkinson Ltd.

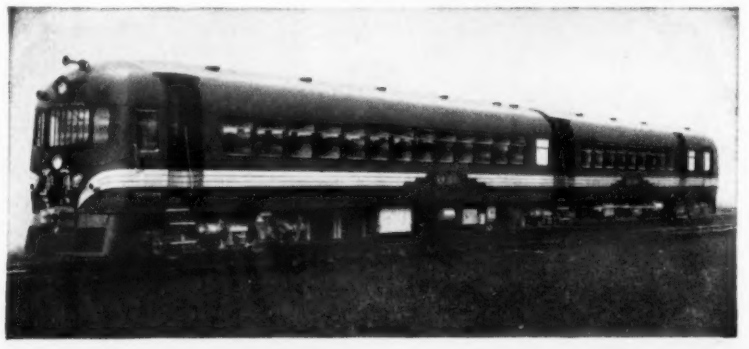
BRITISH RAILWAYS

Three Unit Diesel Mechanical Railcars



GHANA RAILWAYS

440 h.p. Diesel-Electric Locomotive



NEW ZEALAND GOVERNMENT RAILWAYS

Twin Articulated Diesel Mechanical Railcars

In collaboration with The Drewry Car Co. Ltd.

BRITISH RAILWAYS

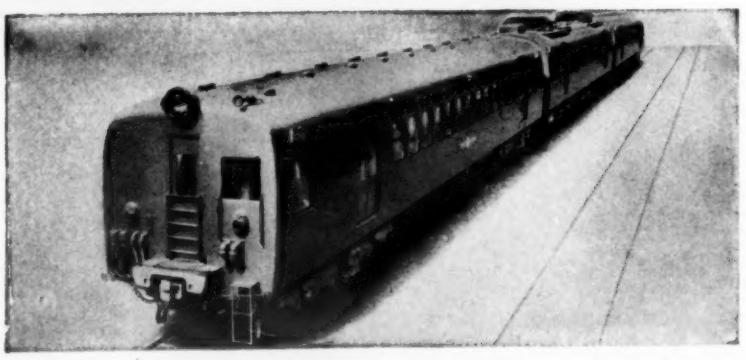
1,160 H.P. Diesel-Electric Locomotive

In collaboration with Sulzer Bros. (London) Ltd. and Crompton Parkinson Ltd.

SANTOS JUNDIAI RAILWAY, BRAZIL

3,000 Volts, 800 H.P. Three Car Train

In collaboration with The English Electric Co. Ltd.



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MODERN AIRWAYS and COMMERCIAL AVIATION SECTION

A FORTIETH BIRTHDAY

Another Qantas Landmark

LAST week saw the fortieth birthday of the senior airline of the British Commonwealth for, on August 16, 1920, Queensland and Northern Territory Aerial Services, Limited, was registered with a capital of £6,037 and two small biplanes—a BE2 and an Avro 504 with a Sunbeam engine. The two men who started Qantas had served with the Australian Light Horse and the Australian Flying Corps in the Middle East, and were commissioned by the Federal Government to survey, by car and on foot, an air route from Longreach in Queensland to Darwin in the Northern Territory, over some most inhospitable country. They prepared landing-grounds and laid down supplies for the first England—Australia flight and to Lieut W. Hudson Fysh, D.F.C., and Lieut. Paul J. McGinness, D.F.C., D.C.M., this journey provided the challenge which they sought; it gave them a vision of what air transport could do in the outback of Australia.

First Regular Service

After two years of demonstration flights, pleasure flights and charter trips, Qantas secured the air mail contract and Government subsidy for the first regular air service in Eastern Australia between Charleville and Cloncurry and on November 3, 1922, Alexander Kennedy, one of the first directors, at the age of 85, fulfilled his ambition to be the first passenger in an Armstrong-Whitworth FK8 (G-AUDE). He boarded at Longreach, the aircraft having been flown with mail only from Charleville the previous day by McGinness: the Longreach—Cloncurry section was flown by Fysh. During 1923 and 1924 the small fleet was augmented by further aircraft, some of them ex-military machines and some of them new. The two DH9Cs, imported in 1923, aroused great interest because the passenger accommodation was enclosed so that the two passengers could dispense with the customary cap and goggles. Through the 1920s, the little bush airline grew steadily into an accepted and important instrument of Australian communications. The routes were extended to Darwin in the north and Brisbane in the east. In the first months of the company, one of the charter flights was to carry a maternity case to hospital—the first airborne patient in Australia. Six years later, in May, 1928, the Flying Doctor service was inaugurated with Qantas aircraft and pilots.

By now the long-existing plans for the Empire Air Route from London across the Middle East, through Singapore to Darwin were coming nearer to fruition and Qantas co-operated with Imperial Airways in the experimental air mail runs from 1931 onwards. In 1934 the first regular London—Sydney service was begun. Qantas had been flying only within Australia, picking up the mail at Darwin initially on December 10, 1934, in a DH61 and carrying it on to Brisbane. But, early in 1934, it joined with Imperial Airways to form Qantas Empire Airways, Limited, and gradually the new company divested itself of its internal services and concentrated its attention on international routes. Its requirements were, moreover, responsible for the development by de Havilland of the four-engined DH86 to operate the Singapore—Sydney section of the route and these commenced so to do on February 25, 1935, when VH-USC left for Singapore. Another aircraft (VH-USF) left Singapore for Brisbane with mail the same day.

Flying-Boat Services

The advent in 1938 of the Short Empire flying-boats brought new standards of comfort. Qantas was, of course, already operating as far as Singapore and now its aircraft continued through to London, albeit with Imperial Airways crews west of Singapore. The outbreak of war in Europe in September, 1939, found Imperial Airways in the process of amalgamating with the more recently founded British Airways to form the British Overseas Airways Corporation. The merger was completed but re-equipment and route-expansion plans were suspended as aviation became completely subservient to defence needs. Q.E.A. remained a commercial enterprise but its resources were urgently needed by the Royal Australian Air Force and all civil pilots were already members of the R.A.A.F. Reserve.

By 1941, B.O.A.C. resources were extended to the utmost and Qantas undertook the flying-boat operations as far as Karachi. The fall of Malaya and Indonesia seemed likely to interrupt the air route between Britain and Australia, but the extension of the war into the Pacific made it imperative that direct air communications should be re-established. A month or two before the European war began, there had been a survey flight across the Indian Ocean to gauge the possibility of a reserve route from Western Australia through the Cocos-Keeling Islands, Diego Garcia and the Seychelles to Mombasa. Here it would link with a service from the United Kingdom through the Gambia and Nigeria and across Equatorial Africa.

When Italy entered the war in 1940 the reserve route took a different form; landplanes operated from England over French North Africa to Nigeria and then across to the Sudan to connect with the Horseshoe flying-boat route from South Africa through East Africa, Egypt, Iraq and the Persian Gulf to Karachi, Calcutta, Bangkok and Singapore, and so to Australia. On February 14, 1942, the flying-boats were ordered to suspend operations between Batavia and Calcutta and on the following day, Singapore surrendered.

Reforging the Link

For the survey of the reserve route in 1939, the aircraft had been a civil version of the United States Navy Consolidated Catalina flying-boat. By 1942, Catalinas were in service with the Allied Forces in the Pacific, in Australia and in Ceylon and many of them had been flown by Qantas pilots on their delivery flights from California to Australia by way of Honolulu, Canton Island and Fiji. Early in 1943, it was decided to restore the air link by direct non-stop Catalina flights of some 3,500 statute miles from Perth in Western Australia to the R.A.F. flying-boat base at the lake of Koggala in the south of Ceylon, and Q.E.A. would operate the service. Two Catalinas were handed over by the R.A.F. in Ceylon and three more, released by the R.A.F. in Britain, were modified and flown out by B.O.A.C. to Koggala. The R.A.F. undertook a series of survey flights during May and June, bringing Qantas staff back to Ceylon on the return flights. On July 10, Qantas flew the first scheduled service out of Koggala on what was the longest ocean crossing by an airline and the link was reforged.

The operation was kept as a military secret and the flights were made in complete radio silence, with navigation by dead-reckoning during the day and by the stars at night. The aircraft had to carry some seven tons of fuel, and the margin between the actual flight plans and the maximum endurance of the flying-boat was uncomfortably small. Over much of the route hostile forces were not far away. The shortest crossing took 23 hr., the longest just under 32 hr. The service began as a weekly one, but the frequency was soon increased and when, after two years, the Catalinas were replaced by Liberators, they had completed 271 crossings without accident.

Return to Normal

The Liberators were originally brought into service to supplement the Catalinas in 1944, by which time the flying-boat route had been extended northwards to Karachi to expedite the mails and for the last year of the war Qantas was operating twice a week with Liberators between Perth and Ceylon, and once a week with Catalinas between Perth and Karachi. All through the wartime operations of Q.E.A. the company worked closely with the R.A.F. and R.A.A.F., but it largely retained its civilian status, flying unarmed aircraft, carrying mail, evacuating civilians and wounded as the war spread through the islands. In 1945 the flying-boats, with their magnificent record, were withdrawn from the Colombo run, and the Liberators were joined by yet another military aircraft converted to civil use—Avro Lancastrian.

By the end of the year, the Australian terminal was moved from Perth back to Sydney and in the spring of 1946, the Darwin—Singapore sector was reinstated; Lancastrians operated right through from Sydney to London, flown by Qantas crews as far as Karachi where they handed over to B.O.A.C. The Empire Route had been restored and the time was ripe to consider its long-term future. Soon after VE-Day, while the Pacific war was still in progress, the newly-constituted Commonwealth Air Transport Council held its first meeting in London. It was agreed that Qantas and B.O.A.C. should operate the Kangaroo service in parallel. The Australian Government purchased the B.O.A.C. interest in Qantas Empire Airways, Limited, then it bought out the shares held privately in Australia and from July, 1947, Qantas became wholly owned by the Commonwealth Government, though it retained its identity as a limited company; Mr. Hudson Fysh (he was knighted in 1953) continued under the new organisation as chairman and managing director and the staff was unchanged. For the basis of its postwar fleet, Qantas chose the Lockheed Constellation. Four were delivered in 1947, and in December the first through flight was made to London Airport.

Postwar Expansion

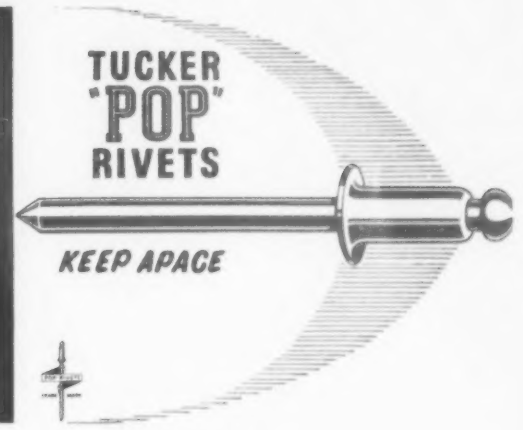
In the postwar years, services were commenced within the territories of Papua and New Guinea, and the routes were extended to Japan and Hong Kong as well as to many of the Pacific islands. The old reserve route came back into the picture in a slightly modified form after a survey flight from Perth to Johannesburg by way of the Cocos-Keeling Islands and Mauritius. In 1952 the Wallaby Route was opened by the same Constellation that had made the first through trip to London. In 1954 Qantas took over the operations of British Commonwealth Pacific Airlines, a company jointly owned by the Australian, United Kingdom and New Zealand Governments, which had been set up after the war to provide a British air service connecting Australia with North America through Fiji, Canton Island and Honolulu. The Qantas route mileage, which was just over 10,000 miles at the end of the war, now approached 70,000 miles—the fifth largest among the world airlines.

Constellations were replaced by Super Constellations, and traffic rights were obtained to extend the Pacific service from San Francisco to New York

(*Continued on page 12*)

The main trunk services of Qantas are maintained by Boeing 707s

IN AN AGE
WHEN THINGS
ARE MOVING FASTER



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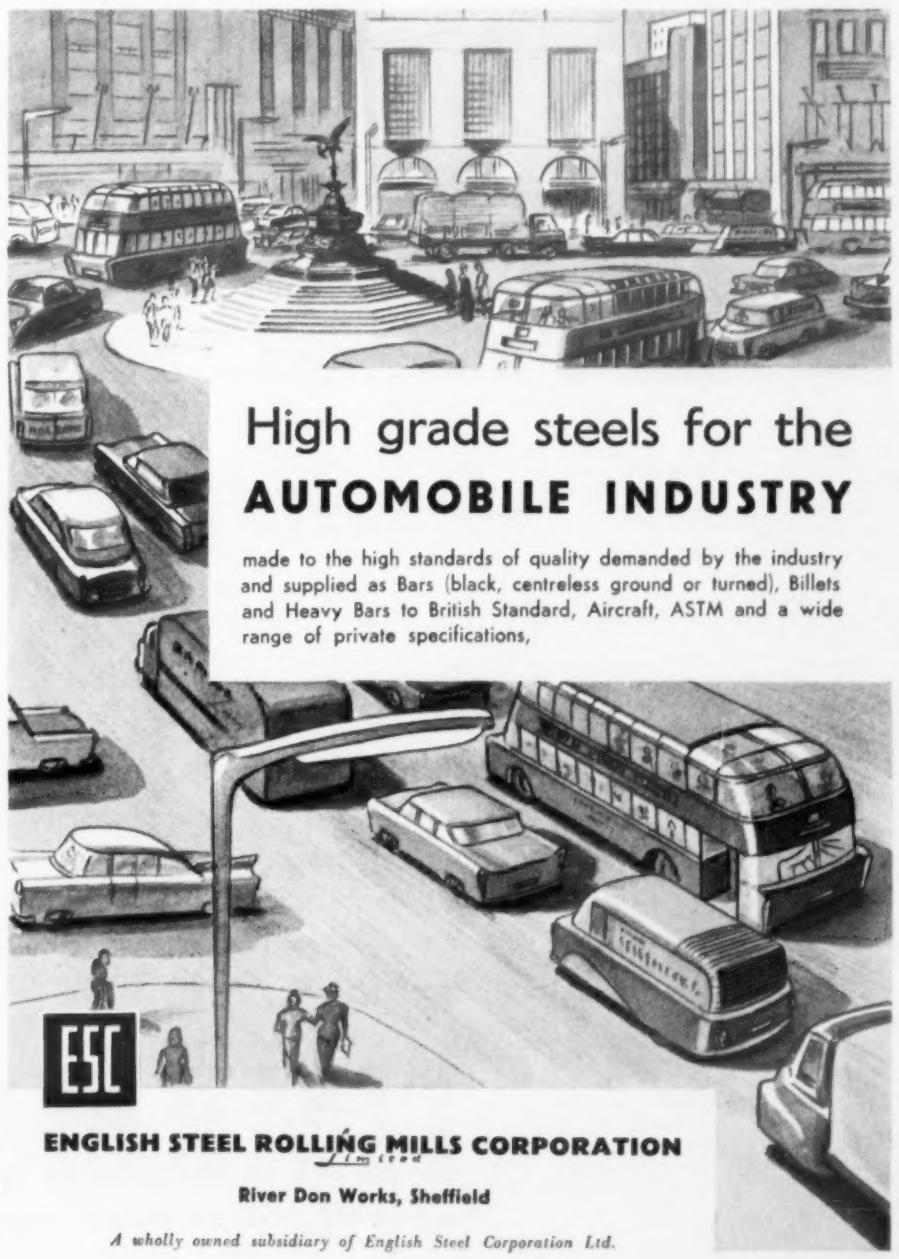

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GEORGE MORTIMER PULLMAN

By Ivan E. Broadhead

2—"PIONEER" (Cont.)*

ANXIOUS to spare Mrs. Lincoln further strain in the long journey to the funeral of her husband, the assassinated President, Illinois State officials made arrangements to transport her direct to Springfield. Someone, possibly a junior official, or perhaps Pullman himself, suggested that the beautiful new car *Pioneer* should be placed at her disposal. In any event, the offer was made—and accepted. Moved, no doubt, by the solemnity of the occasion, the Chicago and Alton Railroad agreed to haul the car, and set an army of workmen on the task of altering platforms and bridges where necessary. Thus, after nearly a year in its shed, *Pioneer* emerged once again—this time to be dedicated in one of the most solemn pageants in all American history—an inaugural run which must be unique in the annals of railways.

An Exceptional Special

On May 2, *Pioneer* became part of the special train which left Chicago under special instructions, the like of which had never been seen before or since. All lines were cleared, and all telegraph stations were kept open continuously. At each crossing stood a guard armed with flag and lantern. Ten minutes ahead of the train ran a pilot engine and the driver was instructed not to pass any station unless signalled with a white flag by day, or a red and white light at night. No matter how unimportant each station, the train reduced speed as it passed through, and always the engine's bell was tolled. Finally, the train arrived at Springfield, Illinois.

Just as Queen Victoria had set the seal of approval on railway travel in Britain some 20 years earlier, so Mrs. Lincoln's trip in *Pioneer* caught the public's imagination and the car achieved fame overnight. From then on it was a celebrated car, forming an essential part of the Chicago and Alton service. Soon afterwards neighbouring railroad systems altered their station platforms and bridges to accommodate *Pioneer*, which occasionally ran over their tracks. Newspapers and periodicals were quick to praise the virtues of travel in the new car. An interesting account from one reporter appeared in the *Daily Illinois State Register*, published in Springfield on May 26, 1865:

> "To the train on the Chicago, Alton and St. Louis Railroad, which passed up at noon today, was attached one of Pullman's improved and beautiful sleeping carriages, containing a party of excursionists from the Garden City (Chicago), to whom the trip was complimentarily extended by the company of the road, and among whom was George M. Pullman, Esq., of Chicago, the patentee of the car. This carriage, which we had the pleasure of inspecting during the stay of the train at our depot, we found to be the most comfortable and complete in all its appurtenances, and decidedly superior in many respects to any similar carriage we have ever seen. It is fifty-four feet in length by ten in width, and was built at a cost of 18,000 dollars, the painting alone costing upwards of 500 dollars. Besides the berths sufficient in number to accommodate upwards of a hundred passengers, there are four state rooms formed by folding doors, and so constructed with the berths that the whole can easily be thrown into one apartment. When the car is not used for sleeping purposes, as in the day, every appearance of a berth or a bed is concealed, and in their stead appear the most comfortable of seats.
>
> "Westlake's patent heating and ventilating apparatus is applied so that a constant current of pure and pleasant air is kept in circulation through the car. In fact, it was useless to attempt to enumerate, in so brief a notice, even a few of the many improvements which has been introduced by the patentees into the carriage, rendering it as they have, superior to any that we have ever inspected. To one fact, however, we will refer in this connection, as especially conducive to the comfort of the travelling public, viz., that a daily change of linen is made in the berths of this new carriage, thereby keeping them constantly clean and comfortable, and rendering the car much more attractive than are similar carriages where this is neglected. As we are informed by Mr. Pullman that these cars will hereafter be run on the St. Louis and Chicago line, we would especially direct the attention of travellers to the fact, and recommend them to investigate the matter of our notice for themselves."

It is not clear what prompted the writer to report that the car would "accommodate upwards of a hundred passengers," and it can only be presumed that he was overawed by the surroundings. Another writer, in the *St. Louis Dispatch* of May 26, praised its interior as being "equal to any parlor in the country."

The Pullman car "Pioneer" of 1865 seen in section and running on the original eight-wheeled trucks

Further Distinction

Further distinction was bestowed on *Pioneer* when President Lincoln's successor, General U. S. Grant, used the car for a journey from Detroit to his home town of Galena. So that the car could pass freely the Chicago and North Western Railroad made the necessary bridge and platform alterations. Although *Pioneer* was now famous as a result of service to Mrs. Lincoln and General Grant, the supreme test was yet to come. It was still the belief of the majority of railroad men that the public would not pay a higher price to ride in luxury. The fact was, the stride forward was too sudden; it was too great a shock to existing theories for even the most progressive railroad men to appreciate its real significance. They assumed that anything which in the slightest degree stepped over bald utility into the boundaries of ornamentation would be treated with contempt by travellers; it was certain passengers would never pay for it.

This was entirely contrary to Pullman's beliefs and he demonstrated how firmly he maintained his own convictions by building an even more luxurious and expensive car. Recent events had been of sufficient import to establish his reputation and enable him to obtain capital for an ambitious building programme. Into *Pioneer* he had invested five times as much capital as any car it succeeded. Into its followers he put six times as much; each car cost 24,000 dollars.

Michigan Central Interest

One of the progressive railroad men of the day who had taken an interest in Pullman's activities was Mr. Joy, president of the Michigan Central Railroad. It was on this line under his patronage that the immediate successors first ran. In addition to the new hinged upper berth, each of these cars featured unusual strength, weight and solidity. The artistic furnishings, decorations, and standards of luxury were unprecedented, and even surpassed *Pioneer*. Although Mr. Joy saw the importance of Pullman's work and its practical possibilities, even he had doubts when he was presented with the conditions under which the new cars were to be run. The additional cost of manufacturing the cars necessitated an increased tariff for berths. The charge for a berth in existing sleeping-cars was 1 dollar 50 cents. In the circumstances, therefore, it was commercially impracticable to offer the new improved berths at less than two dollars. Reluctantly President Joy ruled that the increase could not be attempted. It seemed to him that the imposition of an additional 50 cents would only drive night travellers from the Michigan Central to competing railroads. To this he could never agree.

Appreciating President Joy's concern, Pullman sought a compromise. His solution was to suggest that the travelling public should be allowed to decide. Pullman proposed that the new cars, with their increased rate, be put on trains with the old cars at the cheaper rate. If the travelling public thought the tasteful décor and increased comfort worth two dollars there were the 24,000 dollar cars; if, on the other hand, they were satisfied with less attractive surroundings and wanted to save 50 cents, the cheaper cars were at their disposal. It was a simple solution without favour to either side and President Joy accepted it, putting it into effect immediately.

The Price Test

The result of this test is best described in the words of a contemporary writer:

> "The decision came instantly and in terms which left no opening for discussion. The only travellers who rode in the old cars were those who were grumbling because they could not get berths in the new ones. After running practically empty for a few days, the cars in which the price was 1 dollar 50 cents were withdrawn from service, and Pullmans, wherein the 2-dollar tariff prevailed, were substituted in their places, and this for the very potent reason, that the public insisted upon it. Nor did the results stop there. The Michigan Central Railway, charging an extra 50 cents per night as compared with other eastern lines, proved an aggressive competitor of those lines, not in spite of the extra charge, but because of it, and of the higher order of comfort and beauty it represented. Then followed a curious reversal of the usual results of competition. Instead of a levelling down there was a levelling up to the standard on which the Pullman service was planted and on which it stood out single-handed and alone.
>
> "Within a comparatively short period all the Michigan Central's rival lines were forced by sheer pressure from the travelling public to withdraw the inferior and cheaper cars and meet the superior accommodations and the necessarily higher tariff. In other words, the inspiration of that keynote of vigorous ambition for excellence of the product itself, irrespective of immediate financial returns, which was struck with such emphasis in the building of the *Pioneer*, was felt in the railroad world of the United States at that early date. At one bound it put the American railway passenger service in the leadership of all nations in that particular branch of progress."

Fourfold Effects

The effects of this development were fourfold. First and foremost, it proved Pullman's belief that people were willing to pay for the best. It also established that the travelling public did not look upon the ornate with disfavour. In addition, as might be expected, it fired Pullman's ambition to build the finest sleeping-cars available and to eliminate any imitators who might challenge his supremacy. Finally, it heralded the end of the old-fashioned uncomfortable sleeping-cars in many parts of the world.

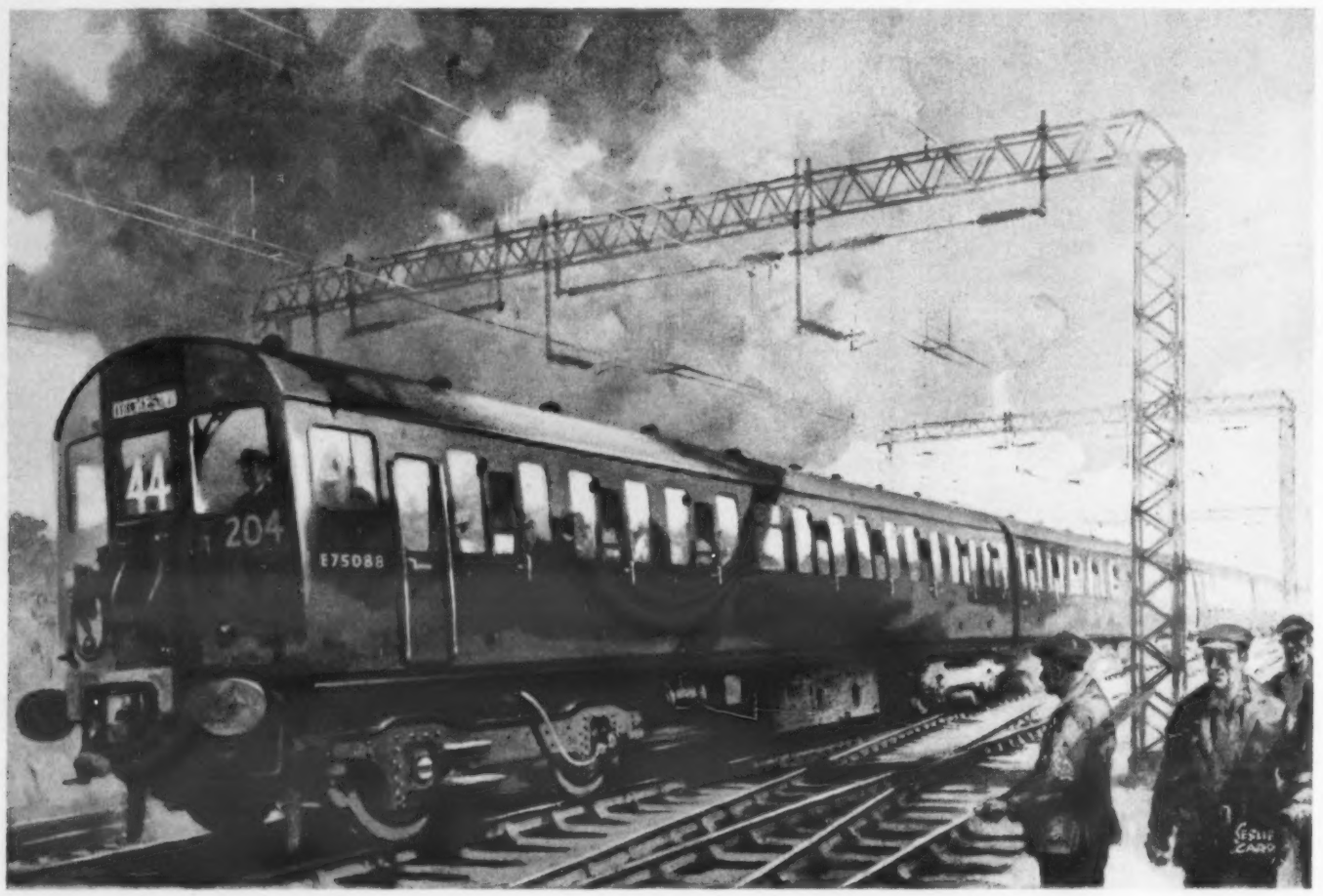
In 1866, five Pullman sleeping-cars began operating on the Chicago, Burlington and Quincy Railroad. These cars were named *Omaha, Aurora, City of Chicago, Atlantic* and *Pacific*. To popularise them an excursion for several hundred invited guests was run in May from Chicago to Aurora, Illinois and return. This attracted considerable interest. Newspapers and other periodicals lavished praise on the "luxurious accommodation" and called Pullman "a great benefactor to mankind." One report enthusiastically pronounced that "the dreaded journey to New York now becomes a mere holiday excursion in his delightful coaches," and predicted that "he will soon have a through line from Chicago to New York, in which a man need never leave his place from one city to the other."

Passing of a Warrior

Meanwhile *Pioneer* continued in service on the Chicago and Alton Line and, during the three decades of its life, carried at least 10 Governors of Illinois, besides at one time or another almost every man prominent in either politics or the trade

(*Continued on page* 14)

* Previous portion of this chapter appeared November 12.



British Railways, Eastern Region

New A.C. Electric Multiple-Unit Stock is now in service on British Railways, Eastern Region. The artist's impression shows Unit 204, typical of the stock equipped with Timken axleboxes on driving and trailing axles.

Timken Roller-Bearing Axleboxes and Timken Motor Suspension Units are also currently being fitted to Electric Multiple-Unit Stock under construction for other regions of British Railways. British Timken, Duston, Northampton, Division of The Timken Roller Bearing Company. Timken bearings manufactured in England, Australia, Brazil, Canada, France and U.S.A.

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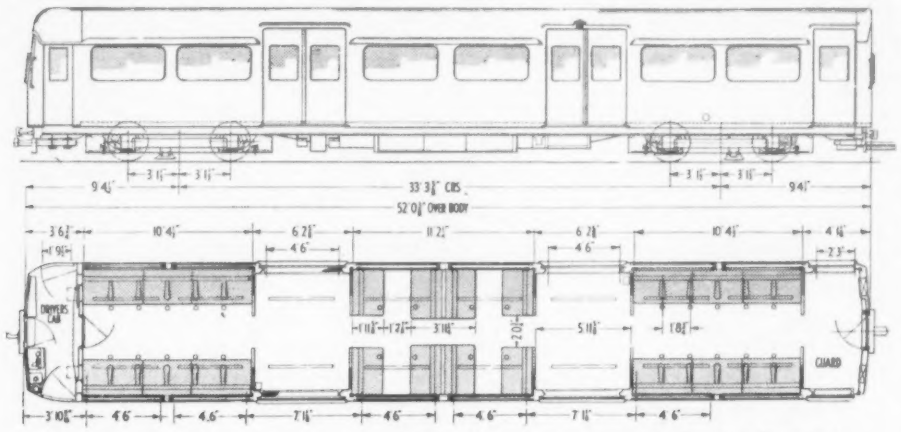
PROTOTYPE TUBE TRAINS

For London Transport

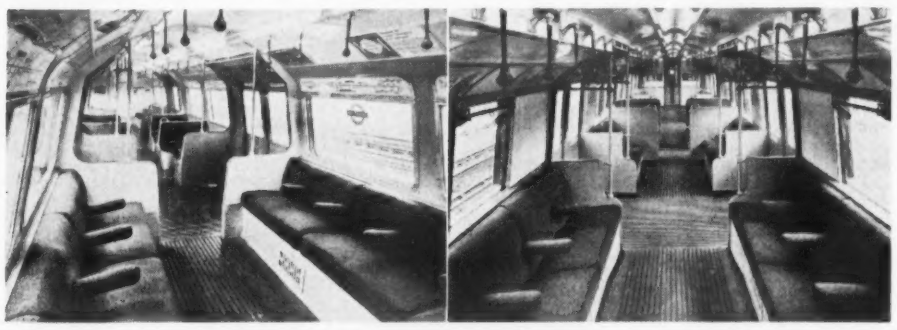
IN OPERATION ON CENTRAL LINE

THE 12 prototype motor cars built for the London Transport Central Line by Cravens, Limited, will be formed, with 12 modernised trailer cars from the Piccadilly Line, into three eight-car trains. As announced last week the first of these is already in service. The new motor cars are of an entirely new design incorporating four traction motors on each car. They measure 52 ft. 0⅜ in. over end panels, 33 ft. 3¼ in. between bogie centres, and have a bogie wheelbase of 6 ft. 3 in. Bogies, underframe, floor and framing are of steel, but the body panels and roof sheets are in aluminium alloy. The weight of a motor car is 30 tons and every motor car has a driving position at one end. The eight-car trains are formed of two four-car units, each consisting of two new motor cars with two modernised trailer cars between them.



Elevation and plan of Craven-built prototype tube motor coach for London Transport

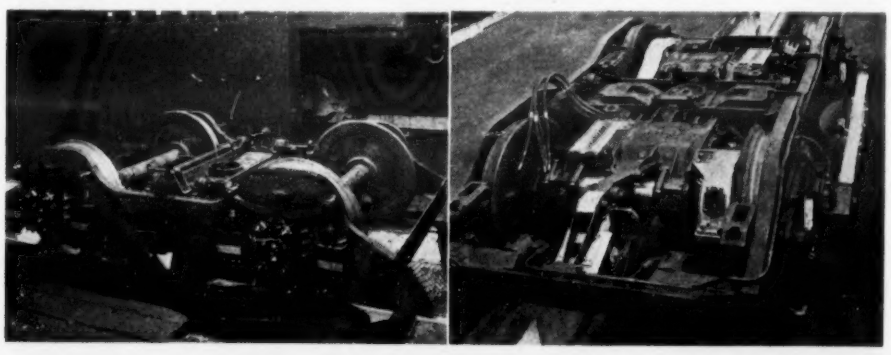
Fully automatic coupling is provided by Wedglock automatic couplers of a redesigned type which will complete pneumatic and electrical control connections, as well as mechanical coupling, whichever way round units may be brought together. Hitherto couplers have been "handed" and most underground cars therefore have "east" and "west" ends and can be coupled only in certain predetermined formations. External features of the new stock include the sloping back of the driving end of the cars above the waist rail, a more pronounced "tumble home" to the body sides than seen in other modern tube stock, and a destination indicator in the front centre of the roof over the driver's cab door. Above the indicator is a ventilation grille allowing air to pass into the car at roof level.



Interior of new motor coach and, right, of modernised Piccadilly line trailer intended to run in the same set

Bogies

The bogies have both axles motored and have 31-in. diameter spoked wheels. Unlike the type of London Transport bogie used in recent stock, which has been made asymmetrical to bring as much weight as possible on to the one motored axle for adhesion reasons, the two-motor bogies of the new cars have to be symmetrical so that the weight is shared evenly between axles. The bogie soleplates are of welded construction, transoms and headstock being attached to the soleplates by knees and rivets. The bolsters are of fabricated construction, stress relieved and provided with side bearing rollers and plain centre bearings. Bolster and axlebox springing is achieved with the use of Metalastik rubber units, the axlebox springs being in the form of chevrons fitted in a yoke casting. Hydraulic dampers are fitted to limit vertical and lateral oscillations.



Trailer bogie with Hoffman roller bearings and Metalastik suspension, and, right, motor bogie of prototype cars built by Cravens of Sheffield

The bogies are arranged for double block braking using an individual brake cylinder unit for each brake block. The non-metallic brake blocks are carried in cast-steel brake heads. Radial-type positive and link-type negative collector shoes are fitted to all bogies on the motor cars. The negative shoe beam is supported from the bogie frame and motor and the positive shoe is carried on a laminated wooden shoe beam which is rubber mounted from the axleboxes. The new bogies were designed in the London Transport chief mechanical engineer's drawing office at Acton.

Car Body Construction

The general layout of the motor car bodies is not unlike that of the 1959 tube stock. There are two 4 ft. 6 in. double sliding doors and one single 2 ft. 3 in. door in each side for passengers, and, as is usual with driving motor cars, a hinged door on each side to give access to the driving cab. Body sides and end panels are ⅛-in. aluminium alloy sheets riveted to the steel frame. The roof panels, also of aluminium alloy, are 14 s.w.g. at doorways and 15 s.w.g. elsewhere. Sheets and panels are to B.S.S. 1470—N.S.5. All exterior panelling has a layer of canvas secured to the inner side of the panels to prevent drumming. The underframe has been designed so that the solebars and continuous crossbars are the main load-carrying members; the centre longitudes are not continuous members but are broken at the crossbars. The steel floorplates are riveted to the underframe and in places have been corrugated to give additional stiffness. The floorplates are covered with the usual ¾½ in. thick grooved maple boards. Wherever steel and aluminium are in contact, barium chromate jointing compound is applied as a protection against electrolytic corrosion.

Windows

On each side of the car, as well as the glazed door panels, there are six double-width windows, two for each of the three bays of seating. The doors slide into pockets behind the large windows, and interior hinged framed casement lights, the same width as the windows, give the effect of double glazing. All body side glazing is in ¼-in. armour plate glass in rubber mouldings. Inside the cars, above the windows are quadrant-type ventilator covers which open inwards and are under passenger control; these have polished aluminium frames which are integral with the casement light frames. Each ventilator cover carries the usual line diagram. The sliding doors are air-operated, guided at the top, and run on wheels on a replaceable flat steel track set in a light alloy sill casting. Lateral location is by non-metallic side guiding slippers concealed inside the door pockets, running on replaceable strips attached to the doors.

Seating in the centre of the three bays is arranged with four double transverse seats in facing pairs on each side of the gangway, as in the 1959 stock. The two end bays have longitudinal seats along each side, each seating six, making 40 seats in all. The four centre transverse seats, i.e. the back-to-back pair on each side, have been made slightly wider than the seats at the windscreen. This can be done because the seats are in the very centre of the car and passenger movement tends to be away from them towards the doors rather than along the aisle between them. The seats and armrests are upholstered in moquette. Use has been made of Melamine-faced plastics panelling with a stardust finish for the body ends and in the saloons. An unpainted fluted aluminium kicking strip is fitted around the seat risers and the body side and ends.

Draught Screens

Glass fibre mouldings over the doors house the fluorescent lighting components and are hinged for maintenance access. Reinforced plastics mouldings are also used to form the interior finish at the bulkhead corners at the trailing end of the car. The moulding on one side houses the emergency candle lamp and the fire extinguisher. All grab poles and hand rails are either of polished stainless steel or of aluminium with satin chrome finish. The deep

(*Continued on page* 15)

The 12 prototype Tube motorcars for London Transport's Central Line built by Cravens Ltd.

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NEWS FROM ALL QUARTERS

Cardiff Market Project

Cardiff City Council is considering a scheme for the removal of its present vegetable and fruit market from the Custom House Street area, which is due for redevelopment, out to Leckwith, where a 10-acre site is available.

District Line Resignalling

The fifth and last stage of the resignalling work at the eastern end of the London Transport District Line was completed on the weekend of November 12-13 when new signalling of standard two-aspect type was brought into use over a further 2½ miles of route.

Road–Rail Competition in East Africa

The Transport Advisory Council in East Africa and the railway committee at their last meeting noted a report by E.A.R management to the effect that the change in rating policy adopted in 1959 seemed to have reduced the erosion of traffic by road transport and endorsed in general terms a continuation of the present overall policy.

Spanish Toll Tunnel

The contract has been let for the construction of a £1,300,000 road tunnel under the Guadarrama Mountains. It is hoped that the tunnel may be opened by the end of 1963. It is sited 34 miles from Madrid on the main road to Valladolid and the French frontier at Irun. The cost will be financed by tolls.

Doubled Rates on Transport Premises

Under the terms of the Rating and Valuation Bill, published last week, freight transport establishments are to be fully rated from April 1, 1963. At present they are rated at only 50 per cent of 1956 values. B.T.C. premises are exempted from this provision. The B.T.C. makes a payment of about £2¾ million in lieu of rates.

Road Casualties in September

Road accidents took a toll of 619 lives in September this year, 51 more than in September, 1959. Most of the increase was due to accidents to pedestrians, which resulted in 243 deaths, or 40 more than a year ago. Included in this total were 60 child pedestrians, an increase of 12, making September the worst month for fatal casualties among child pedestrians for over four years.

Multi-Storey Car Park

Birmingham now has its first multi-storey car park, to hold 600 cars, in commission. Erected by Property and General Investments, Limited, it is on free loan to the corporation until March 31 next. By that time shops on the same site are expected to be ready and the park will be used mainly for customers who will buy parking tickets and then receive a refund if their purchases exceed a certain amount. The park has entrances in the Bull Ring and Park Street and an exit into Moor Street. The entrance from the Bull Ring is unusual as it is by way of a tunnel which dives down from the centre of the new dual carriageway.

Goods Vehicle Registrations in October

Motor vehicles registered for the first time under the Vehicles (Excise) Act, during October, 1960, numbered 92,302, compared with 109,616 in the corresponding month of last year, according to provisional figures issued by the Ministry of Transport. Goods vehicles totalled 19,744, compared with 18,435.

Novel Use for Old Trams

Several old metre-gauge tram motor cars of the Zürich transport undertaking are now at work in a two-mile tunnel giving access to the working site of a new power station, 6,000 ft. above sea level, at Linth-Limmern in Central Switzerland. Providing a most comfortable ride for the construction crews on their way to and from work, the old cars are also used to haul trailers for the transport of stores and cement.

U.S. Road Fatality Rate Dropping

Toll roads in the United States established new safety records during the first quarter of 1960. The fatality rate on 18 major toll roads fell to an unprecedented average of 1.5 per 100 million miles of travel during the period. This compares very favourably with the already low fatality rate of 2.8 per 100 million miles of travel over toll roads during 1959 and is less than one-third of the 1959 rate for all other roads. The national average for all other roads was 5.4 in 1959, 5.6 in 1958 and 5.9 in 1957.

North Eastern Region Freight

Figures recently announced by the North Eastern Region show that in the 10 months January to October of this year more than 46 million tons of freight have been carried—3½ million more than in the same period last year. The major industries of the North East—coal and steel—have been responsible for a good part of this improvement, some of which is undoubtedly due to increased production. Production of steel during October rose by approximately 14 per cent over the year but North East rail carryings went up by 16½ per cent. Coal and coke available for transport increased by 2.1 per cent, but carryings by railway increased by 8.1 per cent.

Train Phones on City System

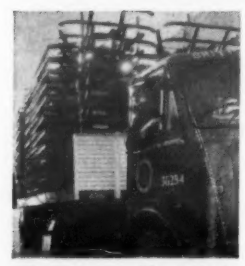
Transport history was made in the U.S.A. earlier this month when the Chicago Transit Authority placed in service a radiotelephone system on its North-South suburban railway route. This permits direct communication between the driver of a train in service and operations control. It is the first time that any urban transport system has been equipped with such a system for regular daily use. Fully-transistorised portable telephones are employed. The driver's voice is radiated as a frequency-modulated signal, carried through the third rail. At intervals of about one mile the line is tapped and the signal fed into a telephone cable which takes it to a transceiver, where the F.M. signal is again converted to voice impulses and fed into telephone lines leading to the central control console. In an emergency the superintendent can use the new system to broadcast messages direct to the passengers in a train.

B.R.S. run an assembly line **100 miles long**

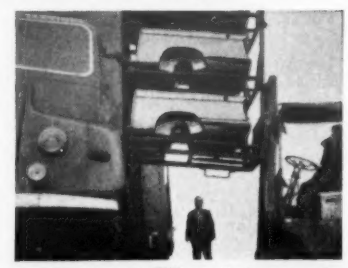
CANLEY WORKS, COVENTRY. Where components become cars. B.R.S. run a shuttle service between Standard/Triumph Coventry factories.

Plastic covers protect the hoods of the Herald Convertibles on the production line. Photograph by kind permission of Standard/Triumph Sales Ltd.

LIVERPOOL. Bonnets come from Merseyside.



WELLINGTON. The chassis starts life here.



BIRMINGHAM. Where the boots and rear wings come from.

Conveyor-belt smoothness speeds the Herald

Like every car manufacturer, Standard/Triumph depends on sub-assemblies arriving from other factories. With clockwork precision. Every day, British Road Services lorries shuttle between Wellington, Liverpool and Birmingham and the main Coventry works, feeding the Triumph Herald assembly lines.

Every day, the 'bits and pieces' for one day's production must be on hand. No more (there's no space for storage) and certainly no less! A bottleneck could be a nightmare. The goods must arrive, and the empty pallets must get back so that the next day's output can be loaded. It's rather like filling a bath, with no plug, from four taps—so that there's always exactly the same amount of water in it. **It takes British Road Services to do it.**

To get things moving-get B.R.S.

(you'll find them in the 'phone book)

COMMERCIAL AVIATION

Shannon Runway Opened

P.A.A. CARGO

OPENING the new £1 million jet runway last week at Shannon, the Eireann Minister for Transport and Power, Mr. E. Childers, gave some figures of airport and tourist financing. Total investment in airports and aircraft was £18 million and estimated expenditure, in the next three or four years, £6 million, while another £4 million would have to be spent building over 1,000 bedrooms with baths. The future of Shannon as an airport and tourist centre was based on a market research report, prepared by Dr. Garrett FitzGerald, predicting that the number of transatlantic passengers would increase from 1,190,000 in 1958 to nearly 2,500,000 in 1965, and that from 4 to 5 per cent of these would visit Ireland, apart from those in transit. By 1965 terminal travellers at Shannon would total 132,000—double the 1958 number. The actual number of passengers estimated to embark and disembark in 1960 was about 74,000—48 per cent more than in 1957, and 20 per cent more than in 1959. Irish International Airlines, in 1960, had secured 44 per cent of the terminal traffic before its Boeing 707 took to the air—a notable achievement. The number in transit at Shannon for 1960 would be about 312,000, an increase of 2,000 on the preceding year. Altogether, nearly 400,000 people would be using the airport in 1960.

The first Boeing reached Dublin on November 18. It had made the New York—Shannon crossing in 4 hr. 57 min., establishing a new record. It has been confirmed that the aircraft will also operate on the Dublin—London route next summer.

Loan for Tunis Airport

The United States-based Development Loan Fund has granted Tunisia a loan totalling $5,100,000 for the building near Tunis of an international airport. The airport is said to be of extreme importance for the general economy of Tunisia as well as for its tourist trade in particular.

New Service Approved

The Minister of Aviation, after considering the recommendations of the Air Transport Advisory Council, has approved the operation of the following service:

An internal service between London (Gatwick) and Blackpool by Claydon Aviation, Limited, from November 10, 1960, until April, 1967.

T.W.A. Earnings

Trans World Airlines, Inc. earned $6,083,000 (£2,172,483) in the first nine months of 1960, compared with $9,068,000 for the first three quarters a year ago, it was announced this week by the T.W.A. board chairman, Mr. Warren Lee Pierson. Total T.W.A. operating revenues for the first nine months of this year were $290,161,000 (£103,628,657)—a 10 per cent advance over the $263,439,000 recorded in 1959 for the same period. The greatest passenger revenue gains were in coach-class travel in the U.S.A., which rose from $89,056,000 to $101,221,000 and for international economy-class which increased from $21,935,000 to $37,951,000.

P.A.A. Reports Record Transatlantic Cargo

A record total of more than 6,000 tons of cargo was carried by Pan American Airways across the Atlantic during the first nine months of 1960, Mr. Willis G. Lipscomb, vice-president traffic and sales, has announced. This year exceeded by 45.9 per cent the volume carried during the same period in 1959. For the January-to-September months of this year P.A.A. westbound cargo totalled 6,631,460 lb. and eastbound cargo reached 6,212,140 lb. On November 10 the airline inaugurated a direct all-cargo service linking the markets of the United States with the Middle East, and the new schedule increased Pan American's all-cargo services from London to New York to 10 a week.

Executive Flying Facility for Elmdon

A new facility for business executives will be provided from Birmingham Airport by the Oxford Aeroplane Club in the new year. Three American aircraft (one Piper Apache and two Tri-Pacers) out of the 12 used by members of the club will be available at the airport, with two commercial pilots standing by at all times. The club has been encouraged to start the venture by its success in providing comfortable and easy-to-fly aircraft for members. Birmingham businessmen frequently travel down to the club's base at Kidlington Airport, near Oxford, to learn to fly these aircraft and in addition to hiring them out to customers either to fly themselves or use as air taxis, complete with pilot, the club will offer flying lessons during the flights to destination and back.

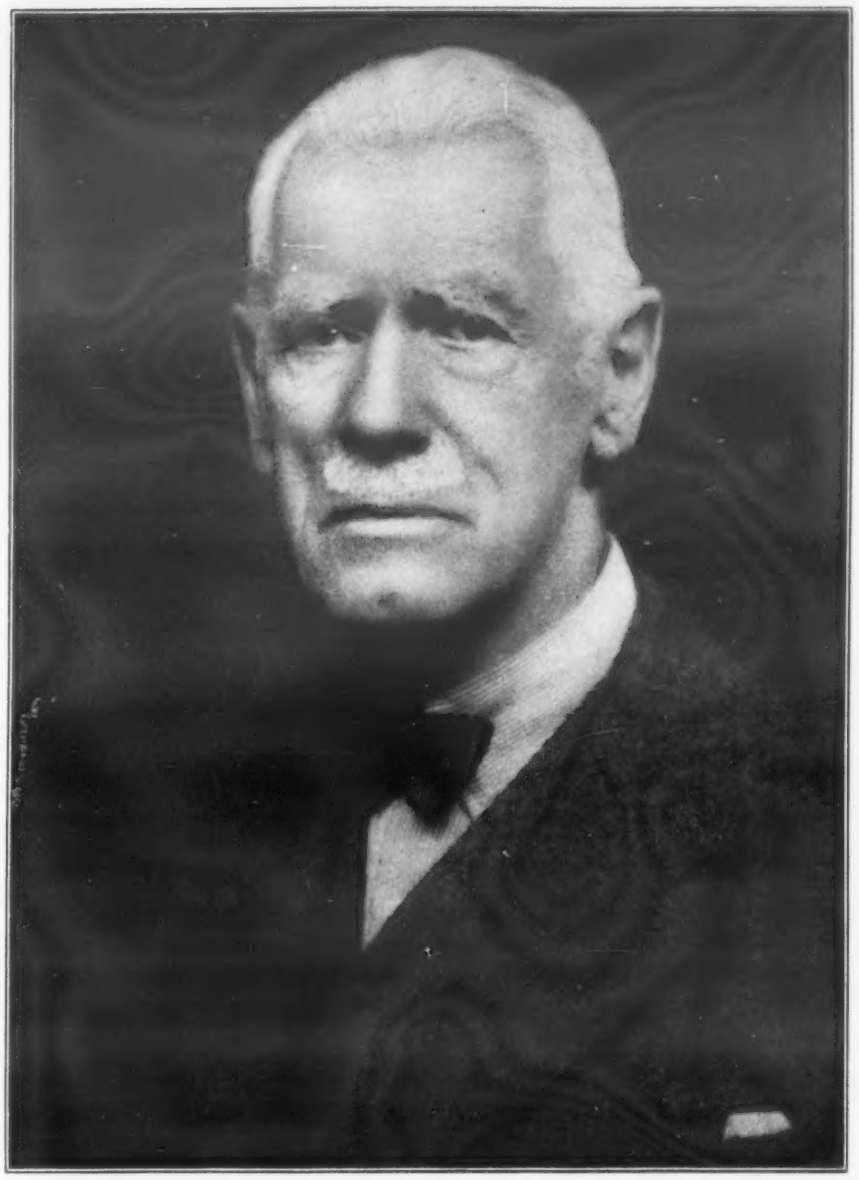
J.A.L. Introduces DC6Bs on Tokyo—Okinawa

From November 15, Japan Air Lines has been using DC6Bs on flights between Tokyo and Okinawa via Osaka and Fukuoka. In addition, there are two other weekly flights by DC4s on the same route. The new DC6B flights operate on Sundays and Thursdays, leaving Tokyo at 6.30 a.m. and arriving in Okinawa at 2.25 p.m. Return flights leave Okinawa at 4.20 p.m. and arrive in Tokyo at 11.20 p.m. J.A.L.'s full schedule of services to Okinawa, started November 15, includes, in addition to the above four weekly flights, a direct nonstop Tokyo—Okinawa service by DC6B twice a week. Previously, J.A.L. served Okinawa with four weekly DC4 flights from Tokyo via Osaka and Fukuoka plus the twice-weekly DC6B direct service. Introduction of a direct Osaka—Okinawa service, which is planned by J.A.L., has been temporarily delayed.

Swissair Freight Traffic

Swissair freight traffic during the first nine months of 1960 totalled nearly 21 million ton-km., compared with 17 million in the corresponding period of last year, an increase of 19 per cent. The ton-km. offered by Swissair increased in the same period by 15 per cent. All traffic regions of the Swissair network shared in the increase, headed by the Middle East which achieved a rise in freight traffic of 51 per cent. Air freight traffic to the Far East was up by 19 per cent, to South America by 15 per cent and in Europe by 9 per cent. An increase of 12 per cent was recorded on the North Atlantic. Since September 28, Swissair has been operating daily passenger services between Switzerland and New York entirely by jets. As the cargo capacity on a DC8 jet is three to four times larger than on the DC7C previously used, Swissair—in addition to the DC6A which can carry up to 10 tons twice a week across the North Atlantic—offers much greater cargo capacity between Europe and North America than before.

DEATH OF THORNYCROFT CHAIRMAN



The late Sir JOHN E. THORNYCROFT, K.B.E.

• • • • • •

We record with deep regret elsewhere in this issue the death at the age of 88 of Sir John Edward Thornycroft, chairman and governing director of John I. Thornycroft and Co., Limited. Born on September 5, 1872, the elder son of the late Sir John I. Thornycroft, LL.D., F.R.S., who founded the Thornycroft shipyard at Chiswick in 1864, he was educated at St. Paul's School and the Central Technical College, where he took the engineering course. Subsequently he served his apprenticeship at his father's shipbuilding and engineering works, where he passed through the various shops and obtained a practical knowledge of the many activities of the company in shipbuilding. In 1896 he was responsible for the company taking up the manufacture of road motor vehicles, which it has since developed so extensively for commercial, passenger and municipal service at home and overseas and he was, indeed, closely concerned with building Thornycroft steam van No. 1. His work during the war of 1914-18 in the development of high-speed naval vessels, and the other assistance he and his company were able to render to the Navy and Army, was rewarded by his being created a K.B.E. in 1918. He was a vice-president and past-president of the Institution of Naval Architects, past-president of the Institution of Civil Engineers, past-president of the Institution of Mechanical Engineers, and a member of the Institute of Transport. He was one of the leading authorities on marine and automobile engineering matters, and contributed several papers dealing with these subjects to the proceedings of learned bodies; he was awarded the gold medal of the Institute of Transport for a paper entitled "Road Vehicles for Goods and Passenger Services," read at the Institute's annual congress in London in May, 1922. He was a director of the Southampton, Isle of Wight and South of England Royal Mail Steam Packet Co., Limited, and served from December, 1928, as a director of the former Southern Railway Company.

IN PARLIAMENT

Way Open to 36 ft. Buses

B.R. FINANCES

THE Minister of Transport has decided to circulate to interested organisations for comment a proposal to raise the maximum permitted width of public service vehicles from 8 ft. to 8 ft. 2½ in., and their maximum length from 30 ft. to 36 ft. This measure, if adopted, would bring these limits into line with those generally prevailing on the Continent. MR. E. MARPLES said this at question time last week. He did not indicate whether there would be any restrictions on the use of 36 ft. vehicles.

B.R. Finances

MR. R. MELLISH asked the Minister of Transport when he expected to receive the reply of the British Transport Commission to the recommendations of the Select Committee on Nationalised Industries which recently inquired into the financial structure of British Railways. MR. MARPLES, "Shortly."

Roundabout v. Flyover

MR. E. MARPLES, in an answer on the relative costs of roundabouts and flyovers, said that the design of any particular junction, and hence the cost, must depend on such factors as the alignment of the roads, the volume of traffic and the direction of the main turning movements. However, the following figures might be taken as indicative of the relative costs of a flyover and of a roundabout at a major junction on a trunk road in a rural area:

Flyover with slip roads	£110,000
Roundabout	£25,000

Traffic Wardens Relax a Little

Although traffic wardens in parking meter zones had no statutory discretion, in fact they were exercising a discretion in the issue of traffic tickets. LORD BATHURST said this on behalf of the Government in the Lords in a debate on the subject. A traffic warden gave a few minutes to load or unload, or to get into or out of a car in a restricted spot, he said. Measures had been taken to see that excessively severe cases such as had been mentioned did not happen again. "Traffic wardens have been cursed, they have been abused, they have been driven at by motorists, they have been swindled. I think it can be said it is becoming a sport to try to swindle the traffic wardens, who are learning a lot of most surprising things about human nature," he added. On an average turn of duty a warden gave between five and seven tickets, but for every ticket he gave 20 or 30 "advices."

LETTERS TO THE EDITOR

B.R. Fares

The Editor is always glad to receive letters from readers on subjects germane to the transport industry, but these should be written as concisely as possible. The opinions expressed therein must not, however, be regarded as having editorial endorsement. Where correspondents desire to use a nom-de-plume it is essential that the Editor should be informed of the name

SIR,—Does it not seem strange and uncommercial that British Railways should have decided to offer no advantages for return journeys other, of course, than certain cheap day tickets over short distances. I know that with so many cars now about and there being no advantage in taking a return ticket, many travellers take out a single ticket and look for some other means of performing the return journey, such as a lift by a friend's car or by coach.

It is a commercial practice to give a customer who buys a large quantity some price concession and that is, of course, what the purchaser of a return ticket would be doing. I doubt whether there are many other railways in the world which fail to offer a return fare concession. Also the bus and coach companies offer some concession. It might be in the interest of railway revenue to consider reverting to the monthly return ticket. After all, who normally needs a ticket valid for three months?—Yours faithfully,

F. D. JENKINS.

4 *Reddings,*
Welwyn Garden City, Herts.

[Validity is, of course, the key to the various return ticket concessions, which are by no means universal in Europe.—Editor, MODERN TRANSPORT.]

Metro-Land

SIR,—I am at present engaged in assembling some material for a small exhibition on the theme of *Metro-Land* on December 14 next. It occured to me that perhaps some of your readers may have some material in the way of posters, brochures or photographs that they might be willing to loan for the purpose of this exhibition. All material would, of course, be returned subsequently in the same condition as received.—Yours faithfully,

JOHN R. BATES.

15 *Landswood Road,*
Oldbury,
Birmingham.

London Trolleybuses Before 1930

SIR,—Would you kindly allow me to submit for the record a few comments regarding Mr. J. C. Gillham's excellent article in your issue of November 12? The map shows the terminus at Thames Ditton as Windows Bridge. Although I recall seeing this description on a previous occasion, I have always understood (perhaps wrongly) that the correct name is Winter's Bridge—which I find is the name used in a local directory.

Incidentally, the map shows Thames Ditton, but on the vehicles and in notices, etc., it has been customary to refer to the Winter's Bridge terminus as "Dittons" or "The Dittons"—embracing both Thames Ditton and Long Ditton.

In the paragraphs dealing with the tests in the Wimbledon district in 1922-23, it seems that Queens Road has been mentioned instead of Quicks Road. The former does join Haydons Road, but at a point just south of the railway bridge, to which Mr. Gillham also refers. Quicks Road and the recreation ground are a few hundred yards further south, i.e. much nearer to Merton High Street.—Yours faithfully,

M. H. BUTLER.

12 *Bathurst Avenue,*
Merton Park,
London, S.W.19.

PROGRAMME MACHINES

Lively I.R.S.E. Discussion

BEFORE the normal business at the recent technical meeting of the Institution of Railway Signal Engineers, the president, Mr. W. Owen, referred to the decision of council to provide some form of memorial to the late Mr. T. S. Lascelles. It had been decided that this should take the form of a president's chair, suitably inscribed. This would be presented to the Institution of Electrical Engineers and would always be available for use at meetings of the Institution of Railway Signal Engineers. It was one of a suite of chairs provided in connection with the reconstruction and refurnishing of the I.E.E. building. The chair was uncovered, shown to the meeting and placed in position. The inscription reads:

Presented by the Institution of Railway Signal Engineers in memory of the long and faithful service of Thomas Spooner Lascelles Member 1914—1960. President 1952—1953 Died February 17, 1960

The paper by Mr. W. Woodhouse entitled "Putney Line Programme Machines" gave information much of which was contained in recent articles in MODERN TRANSPORT. Mr. Woodhouse made a brief reference to the historical background of the Putney Line signalling and described the traffic working to be catered for by programme machines. He outlined the difference between the installation described and earlier installations in that a system had to be devised which would deal with a variable day-by-day programme without recourse to several machine rolls. The method employed for the Putney line installation was fully explained by lantern slides of typical circuits and apparatus.

At the conclusion of the paper the president asked Mr. R. Dell to open the discussion. Mr. Dell stated that when they introduced programme machines on the Northern line in 1958 they were quite a new feature and to some extent experimental. It was intended that during 1959 no further developments should take place but that they should learn as many lessons as they could from this first installation. Mr. Dell stated that he measured the success of an installation by the number of failures. In 1959 there were 17 failures, but during 1960 there had been only five failures to date. Of these none was directly attributable to the machines themselves but to circuits and associated equipment.

Mr. Dell then referred to the flexibility between the programme machines introduced on the Putney line and the requirements of traffic operation. He felt that they could now say that programme machines could be adopted to meet any form of railway operation. It had often been said that London Transport equipment was applicable only to a line with standard passenger carrying electric trains, but Mr. Dell was convinced that programme machines could be developed to operate a large London terminus. A feature of programme machine working that had emerged was the problem of keeping records. These disappeared with the abolition of signalboxes and although an attempt had been made to maintain records at the central supervision rooms it had not really been successful. They were now experimenting with a recording which would be able to register the passage of trains at various points on the line by marking on a paper record the appropriate time. The instrument would also read the number on the side of the train and reproduce this on the record. Installations of this type were as yet in the development stage and would be completed next year and included in a new installation at East Finchley.

Mr. Hadaway considered that the introduction of programme machines had occasioned a closer study of the running of the railway than under the former timetable conditions. Formerly, timetables were never disputed though they did not necessarily entirely suit a particular layout. The signalmen, having learnt the layout, understood this and applied their own methods for a solution of local difficulties. These methods could be satisfactory or otherwise and decisions made were not necessarily the most beneficial. The application of programme machines had produced the very best conditions of work study and had ensured the most suitable signalling arrangements.

Mr. Marshall said, as a traffic man, he had been really encouraged by the information he had obtained from Mr. Woodhouse's paper. He had been connected with the previous programme machines on the Northern Line and now also with the Putney line installation. He considered that these installations could be classified as a success, but not a huge success. Any innovation was bound to receive criticism though constructive criticism was desired. Mr. Marshall considered that the allocation panel at Parsons Green was too big and did not give all the information it should do. The traffic staff were required to operate a 100 per cent service but bearing in mind the quality of staff available at the present time consideration should have been given to the person who came to Parsons Green for the first time. He must be able to read the panel at a glance. At other depots a chalked board is used giving time and sidings and the composition of stock. There were two types of rolling stock in use which required slightly different methods of operation. The panel should indicate whether a train shown under a siding would be coming into or going out of that siding.

Yardmaster's Needs

The yardmaster should also be able to indicate more completely his requirements to the programme machine and at the same time receive information from the panel as to the length of train a particular siding could accommodate. Mr. Marshall then went on to explain local difficulties at Parsons Green consequent upon varying siding lengths and the yardmaster's inability actually to see train lengths due to being preoccupied in his office with matters regarding train crew arrangements.

After further discussion Mr. Woodhouse dealt with the points raised by the speakers. He referred to Mr. Marshall's criticism regarding the siding allocation panel and agreed that more development work was essential. He also stressed the necessity for miniaturisation of components. Before closing the meeting the president said that they had all heard how every section on the railway had co-operated in the task of running the trains, from the signal engineer's designs to the actual operation by the traffic staff and also those responsible for preparing the timetables to fit in with the programme machine working.

B.T.C. TRAFFIC RECEIPTS: PERIOD NO. 11—1960

	Four weeks to			Aggregate for 44 weeks to		
	Nov. 6 1960	Nov. 1 1959	+ or —	Nov. 6 1960	Nov. 1 1959	+ or —
	(£ thousands)			(£ thousands)		
PASSENGERS						
British Railways	10,303	9,512	+ 791	129,600	120,368	+ 9,232
London Transport						
Road passenger services	4,374	4,328	+ 46	48,045	46,379	+ 1,666
Railways	2,178	1,923	+ 255	21,997	20,004	+ 1,993
Provincial and Scottish Buses	4,551	4,398	+ 153	53,009	52,254	+ 755
Ships	262	294	— 32	6,723	6,994	— 271
Total Passengers	21,668	20,455	+ 1,213	259,374	245,999	+ 13,375
FREIGHT, PARCELS AND MAILS						
British Railways						
*Merchandise and livestock	8,630	8,672	— 42	86,249	83,965	+ 2,284
*Minerals	4,139	3,889	+ 250	41,423	37,032	+ 4,391
*Coal and coke	9,403	8,679	+ 724	90,887	91,422	— 535
*Parcels, etc., by coaching train	4,532	4,370	+ 162	47,307	45,513	+ 1,794
**Total Freight British Railways*	26,704	25,610	+ 1,094	265,866	257,932	+ 7,934
Others	4,786	4,608	+ 178	48,803	46,741	+ 2,062
Total Freight, Parcels and Mails	31,490	30,218	+ 1,272	314,669	304,673	+ 9,996
Aggregate	53,158	50,673	+ 2,485	574,043	550,672	+ 23,371

*Includes receipts from collection and delivery, etc., and from railway freight traffic within Commission-owned dock areas. Comparisons are affected by changes in fares and charges which have taken place from time to time.

QANTAS LANDMARK

(*Continued from page 7*)

and London so that Qantas became the first airline to operate services right round the world with a routeing across the United States. In 1959, the piston-engined aircraft on the main routes were replaced by Boeing 707s and Q.E.A. was the first company outside the United States to operate the big jets and the first to provide a pure jet service round the world. It has widened its commercial interests by acquiring a one-third share in Malayan Airways and by taking over the control of Fiji Airways. The pool partnership with B.O.A.C., originally arranged for the Kangaroo Route, has been extended across the Atlantic, and over part of the route a third member, Air-India International, has joined the partnership. The Wallaby service is flown in parallel with South Africa Airways.

As these developments have taken place, Qantas has gradually relinquished its local services in and around Australia, so that it can concentrate upon the main trunk routes. In 1949 the Queensland domestic services were given up and the company's 21 years' association with the Flying Doctor service ended; ten years later the company withdrew from the New Guinea area.

Now, after 40 years, the airline that was born in the Queensland outback ranks among the great international airlines of the world and it is unique in that Sir Hudson Fysh, its co-founder and for 32 years its managing director, is still, as chairman, able to make his 45 years' experience in aviation available to the enterprise with which his name will always be associated.

FORTHCOMING EVENTS

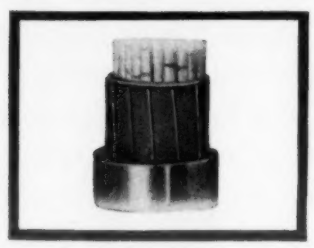
November 26.—O.S. D. S. Giles, "Irish Buses." Y.M.C.A., Newcastle upon Tyne. 6.30 p.m.
Rly.C. Annual dinner. Danish Club, Knightsbridge, S.W.1.
November 29.—Inst.T. (West Middx.). A. J. Burkart, "Airline Advertising." Conference Room, Control Tower, London Airport Central. 6 for 6.30 p.m.
O.S. J. H. Price, "Museum Tramcars." Victoria Coach Station, S.W.1. 6.45 p.m.
I.Mech.E. (Automobile). Discussion, "Gear Materials and their Treatment." 1 Birdcage Walk, S.W.1. 6 p.m.
November 30.—R.S.A. A. Samuels, "Traffic and Parking Problems." John Adam Street, W.C.2. 6 p.m.
L.R.T.L. H. Luff, "On Rails in the Pyrenees." 183 Drummond Street, N.W.1. 7 p.m.
I.Mech.E. H. F. Brown, "Economic Results of Diesel Electric Motive Power on the Railways in the United States of America." 1 Birdcage Walk, S.W.1. 6 p.m.
P.R.D.G. J. Hancock, "B.T.C. Omnibus Interests." Technical College, Peterborough. 6.45 p.m.
December 1.—R.I.N.A. J. E. Connolly, "Strength of Propellers." 10 Upper Belgrave Street, S.W.1. 4.45 p.m.
Inst.T. (Merseyside). Charles S. Devoy. Films. Chamber of Commerce, Liverpool. 6.30 p.m.
December 2.—Inst.T. (Leeds G. and S.) Annual dinner. Griffin Hotel, Leeds 1. 7.15 p.m.
Inst.T. (South Western). Annual luncheon and visit of president. Imperial Hotel, Exeter. 12.30 for 1 p.m.
L.R.T.L. Films. Exchange and Engineering Centre, New Street Station, Birmingham. 7 p.m.
Inst.H.E. W. S. Hydes, "Highway Design." The Appleby Theatre, University of Durham Science Laboratories, South Road, Durham City. 7 p.m.
S.L.S. (Dundee). Films. Technical College, Dundee. 7.30 p.m.
December 3.—H.M.R.S. Annual general meeting. Euston Hotel, N.W.1.
S.C.T.S. Annual dinner. St. Ermin's Hotel, Westminster. 6 for 6.30 p.m.
S.L.S. (Cambridge). J. S. Davies, "Some L.S.W.R. Locomotives." Station Hotel, Cambridge. 5 p.m.
S.L.S. (Sheffield). Alderman J. Armitage, "Some Memories of an L.N.W. Loco Man." Y.M.C.A. Rooms, Fargate. 6.45 p.m.
S.L.S. (Liverpool). J. B. C. M'Cann. Films, "Rail Travel in Colour." Conference Room, Central Station, Liverpool. 7 p.m.

KEY TO CODE

A.D.A.—Aluminium Development Association; A.F.—Aviation Forum; B.I.R.E.—British Institution of Radio Engineers; B.L.S.—Branch Line Society; B.R.E.R.S.R.S.—British Railways Eastern Region Staff Railway Society; D.E.U.A.—Diesel Engineers and Users Association; E.R.S.—Electric Railway Society; H.C.V.C.—Historic Commercial Vehicle Club; H.M.R.S.—Historical Model Railway Society; Inst.C.E.—Institution of Civil Engineers; I.E.E.—Institution of Electrical Engineers; I.N.A.—Institution of Naval Architects; I.R.S.E.—Institution of Railway Signal Engineers; I.R.T.E.—Institute of Road Transport Engineers; I.T.A.—Industrial Transport Association; I.Loco.E.—Institution of Locomotive Engineers; I.Mar.E.—Institute of Marine Engineers; I.Mech.E.—Institution of Mechanical Engineers; I.Nav.—Institute of Navigation; Inst.H.E.—Institution of Highway Engineers; Inst.P.—Institute of Petroleum; Inst.T.—Institute of Transport; Inst.Traf.A.—Institute of Traffic Administration.
L.M.R.L.D.S.—London Midland Region Lecture and Debating Society; L.R.T.L.—Light Railway Transport League; N.E.C.I.E.S. North East Coast Institution of Engineers and Shipbuilders; N.T.M.R.C.—Norbury Transport and Model Railway Club; O.S.—Omnibus Society; P.R.D.G.—Peterborough Railway Discussion Group; P.V.O.A.—Passenger Vehicle Operators Association; P.W.I.—Permanent Way Institution; R.Ae.S.—Royal Aeronautical Society; R.C.H.S.—Railway and Canal Historical Society; R.C.T.S.—Railway Correspondence and Travel Society; R.H.A.—Road Haulage Association; R.S.A.—Royal Society of Arts; Rly.C.—Railway Club; Rly.E.C.—Railway Enthusiasts Club; Rly.S.A.—Railway Students Association; S.C.T.S.—Southern Counties Touring Society; S.E.—Society of Engineers; S.L.S.—Stephenson Locomotive Society; S.R.L.D.S.—Southern Region Lecture and Debating Society; S. Wales and Mon. R.D.L.D.S.—South Wales and Mon Railway and Docks Lecture and Debating Society; T.R.T.A.—Traders Road Transport Association; V.P.V.S.—Vintage Passenger Vehicle Society; W.R.L.L.D.S.—Western Region London Lecture and Debating Society; W.W.R.T.S.—West Warwickshire Railway and Travel Society.

STC and Railway Modernisation

A large consignment of communication cable being loaded at the STC North Woolwich Works for rail transport to site near Glasgow.



Specially screened communication cables for the Glasgow Suburban Electrification project

STC are manufacturing and installing communication cables for the Scottish Region of British Railways. A feature of these cables is the in-built screening to reduce the voltages induced from the A.C. traction system.

These lead-covered paper insulated cables for telecommunication and supervisory facilities are of 40 lb/mile conductors and contain from 8 to 54 Pairs.

STC are also supplying the loading and terminal equipment.

Another STC communications cable project for British Railways

STC CABLE AND WIRE GROUP

Standard Telephones and Cables Limited

Registered Office: Connaught House, Aldwych, London, W.C.2

TELEPHONE CABLE DIVISION: NORTH WOOLWICH · LONDON E.16

60/48

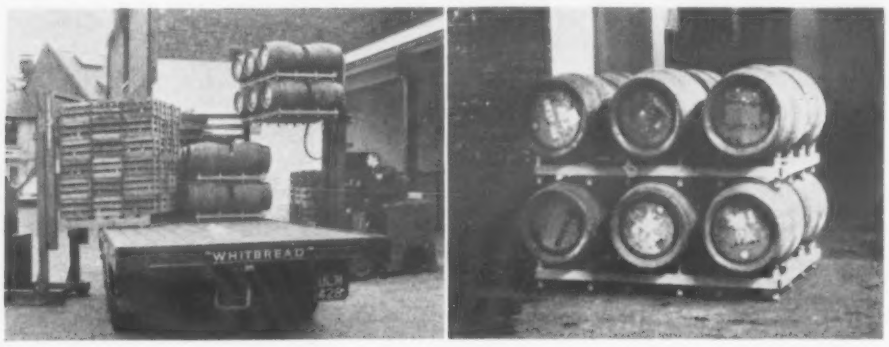
PALLETS FOR CASKS OR DRUMS

Special Design for Brewery

FORK-LIFT trucks are in wide use for handling bottled beer in crates. The standard types of wooden pallets, or the skid stack system, lend themselves very readily to such packs. Casks of beer present rather a different problem and it is taking a long time to get away from the pair of ramps which have been an attachment to brewery vehicles. Two reasons for this is that casks come in different capacities and that their dimensions change after each visit to the cooperage for repairs.

Following investigations carried out by Handling Consultants, Limited, Stroud, Glos, Whitbread and Co., Limited, is using a new type of pallet specially designed for cask handling. Trials have proved a greatly increased use of vehicle capacity, quicker turnround, and also better and easier use of storage space. Two sizes of pallet are in use, namely firkin (9 gal.), which pallet also takes the 10-gal. metal keg now coming into wider use, and the kil (18 gal.). The illustration shows the general design of one of the pallets and also the method of loading vehicles with them.

Each cask is given its own individual four-point suspension so that no movement can take place, and rubber tips protect both the containers and the vehicle floor. In use it has been found that pallets can be transported four high on vehicles and in stores they can be stacked eight high. This use of height in the storages area frees valuable floor space for fork truck movement, etc. Repairs and replacements after 12 months' use have been negligible. Manufacture and marketing of these pallets, for which a patent has been filed, is in the hands of Service Engineering Co. (Northampton), Limited. This company already manufactures the Mackaness hydraulic sack loader.



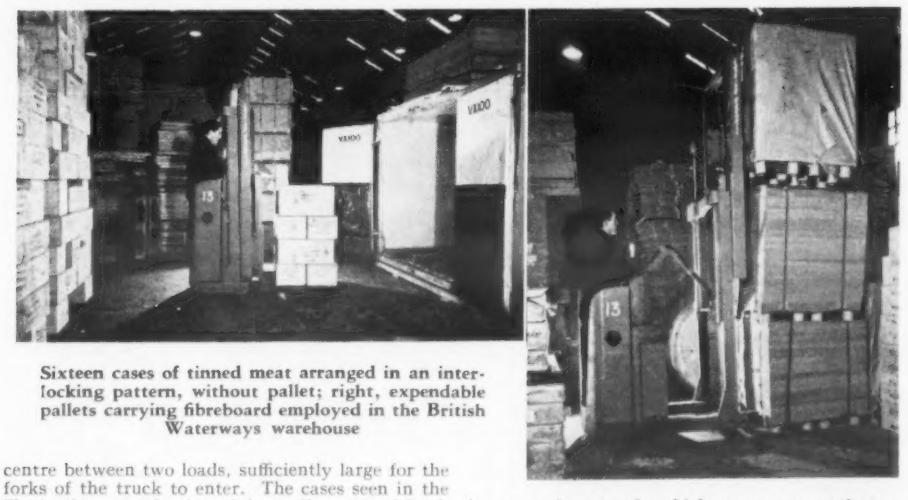
Loading of crates on normal pallets and casks on the special pallet goes on simultaneously; right, a unit load of twelve 9-gal. firkins

Handling Without Pallets

ON REACH TRUCKS

A METHOD of mechanically handling wooden cases in unit loads of 1 ton, without any pallet, has been developed by the Birmingham Quay depot of British Waterways. Unit loads are moved by Lansing Bagnall reach trucks, the cases being arranged in an interlocking pattern. The outside cases in the top layer are stood on edge, the centre case resting on its base. If a similar load is placed on top of this, a gap is left at the centre between two loads, sufficiently large for the forks of the truck to enter. The cases seen in the illustration contain tins of Australian corned beef, but the principle can be applied to any cases, provided their end cross-section is not square.

To avoid locking up a lot of capital in pallets, extensive use is also made at this depot of expendable pallets. A typical example is shown carrying fibreboard sheets. Considerable economies in space have been effected by the purchase of the reach truck, which owes its name to the fact that the entire mast assembly can be advanced and withdrawn on rails along the chassis. Loads are thus carried within the wheelbase and advanced only for picking up or depositing. This principle results in a very short truck, which can consequently turn, with a standard 40 in. by 40 in. pallet, in gangways only 6½ ft. wide. An ordinary rider fork truck of the same capacity requires aisle widths of about 10 ft.

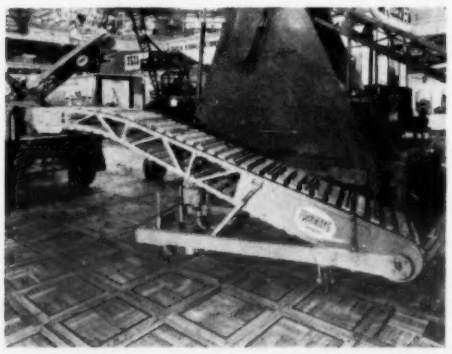


Sixteen cases of tinned meat arranged in an interlocking pattern, without pallet; right, expendable pallets carrying fibreboard employed in the British Waterways warehouse

SWAN-NECK CONVEYOR

Hydraulic Boom

ON conveyors seen in transport and warehousing or distribution applications the name of Fourways (Engineers), Limited, continually crops up. An improved version of one of the conveyors made by this company now incorporates a swan-neck to give greater handling and loading facilities. Of light construction and highly mobile, it has a reversible track and is suitable for both loading and unloading and for limited stacking. Powered by a one-h.p. electric motor, this LW model has a unit load of 2 cwt. and a maximum distributed weight of 4 cwt. The boom is hydraulically operated. The standard LW model can be supplied in two sizes, model 8 having a delivery range of between 4 ft. and 8 ft. and model 10 with a delivery range of 5 ft. and 10 ft. A portable adjustable horizontal conveyor, up to 30 ft. in length, which can be used for such purposes as mechanising the gap between transport and stacker, is also available.



Fourways conveyor with swan-neck

FORK TRUCKS GO ABROAD

Matbro Initiative

AS part of a carefully planned expansion programme the fork truck division of Matbro, Limited, is creating export outlets throughout the world for its range of indoor-outdoor fork-lift trucks. Matbro fork-lift trucks have already earned an enviable reputation for rugged reliability under heavy-duty conditions in Britain and should enjoy a ready market overseas. They have a special appeal to users in partially or undeveloped areas where only the toughest of trucks will make the grade. At the same time their agility in tight corners, allied to really big load-carrying capacity, makes them ideal for all those awkward jobs which occur especially in the basic industries.

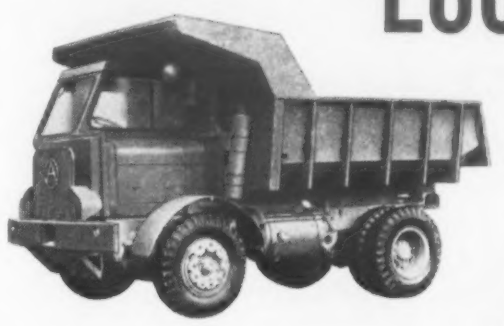
Steel works, timber yards, building projects, civil engineering undertakings, food distributors, shipping, docking and railway systems are but a few of the industries where these versatile machines can take the hand out of handling.

Ford Engines for Service

All the large trucks in the Matbro range use Ford-based engines and transmissions. This automatically provides world-wide availability of parts and service. Because of this unique Ford feature and the basic simplicity of the overall design the equipments have been christened "the world's most serviceable fork-lift trucks." A trilingual brochure in English, French and Spanish has been prepared to introduce the new range of Matbro fork lifts to overseas markets. Copies can be obtained on application to the export sales department, fork-lift truck division of Matbro, Limited, at Matbro Works, Horley, Surrey.

The European Productivity Agency of O.E.E.C. (Organisation for European Economic Co-operation), Paris, has acquired a copy of the latest Wolf Electric Tools, Limited, industrial film, *One Jump Ahead*, for showing to engineering audiences throughout the areas under O.E.E.C. coverage.

BRITAIN'S MOST ECONOMICAL HEAVY VEHICLE



No matter what the load or route an Atkinson will give real economy—in the order of a minimum of 10% reduction in your fuel bill. Each Atkinson is custom built for *your routes* and *loads*; and you'll be surprised at the saving an Atkinson can give you primarily on fuel consumption and maintenance. Contact one of our distributors today—you'll be surprised to learn how much an Atkinson can save you.

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'SUPER TRANSPORT'

A premium tyre for lower running costs

Experience Counts—
45 Factories throughout the world.
Firestone total sales exceed £1,000,000 per day.
DRIVE SAFELY
Firestone TYRES
—consistently good

IN TRACTION SERVICE IN 18 COUNTRIES ... Hewittic RECTIFIERS

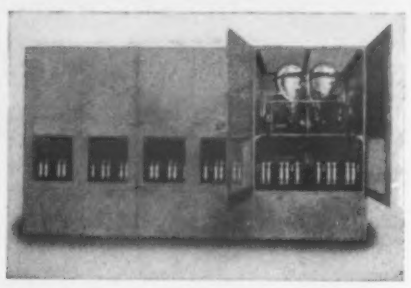
the converting plant used by the World's principal railways

BRITISH RAILWAYS
SOUTHERN REGION

One of 28 substations equipped with Hewittic Rectifiers by the British Transport Commission for the Southern Region of British Railways. The photograph shows Wimbledon substation with one wall cut away to show the two 2,500 kW rectifiers in this half of the building.

LONDON TRANSPORT RAILWAYS

The 4,000 kW Bond Street substation, equipped exclusively with Hewittic Rectifiers. The plant comprises four 1,000 kW combined rectifier and enclosed air-cooled transformer units. This company is also responsible for the supply and installation of all A.C. and D.C. control gear. Some 90,000 kW Hewittic Rectifiers have been supplied to the London Transport Executive.



CANADIAN NATIONAL RAILWAYS

The electrified section of the Canadian National Railways, comprising some 70 track miles in the vicinity of Montreal Terminal is supplied with D.C. by Hewittic Rectifiers in two 3,000 kW substations at Central Station and Saraguay. The photograph shows one of the four 1,500 kW equipments in service. These are designed for operation at 3,000 volts, D.C.

HACKBRIDGE AND HEWITTIC ELECTRIC CO., LIMITED
WALTON-ON-THAMES - SURREY - ENGLAND
Telephone: Walton-on-Thames 28833 (8 lines) Telegrams & Cables: "Electric, Walton-on-Thames"

Overseas Representatives: ARGENTINA: H. R. Roberts & Cia, S.R.L., Buenos Aires. AUSTRALIA: Hackbridge and Hewittic Electric Co., Ltd., 171 Fitzroy Street, St. Kilda, Victoria; N.S.W., Queensland, W. Australia: Elder Smith & Co., Ltd.; South Australia: Parsons & Robertson, Ltd.; Tasmania: H. M. Bamford & Sons (Pty.), Ltd., Hobart. BARBADOS and surrounding islands: Electric Sales & Service, Ltd., St. Michael. BELGIUM AND LUXEMBOURG: Pierre Pollie, Brussels, 3. BRAZIL: Oscar G. Mors, São Paulo. BRITISH GUIANA: Dandor Commission Agency, Georgetown. BURMA: Neonlite Manufacturing & Trading Co., Ltd., Rangoon. CANADA: Hackbridge and Hewittic Electric Co. of Canada, Ltd., Montreal; The Northern Electric Co., Ltd., Montreal, etc. CEYLON: Envee, Ess, Ltd., Colombo. CHILE: Sociedad Importadora del Pacifico, Ltda., Santiago. EAST AFRICA: G. A. Neumann, Ltd., Nairobi. EGYPT: Giacomo Cohenca Fils, S.A.E., Cairo. FINLAND: Sähkö-ja Konetiike O.Y. Hermes, Helsinki. GHANA. NIGERIA AND SIERRA LEONE: Glyndova, Ltd. GREECE: Charilaos C. Coroneos, Athens. INDIA: Steam and Mining Equipment (India), Private, Ltd., Calcutta; Easun Engineering Co., Ltd., Madras, 1. IRAQ: J. P. Bahoshy Bros., Baghdad. MALAYA, SINGAPORE AND BORNEO: Harper, Gilfillan & Co., Ltd., Kuala Lumpur. NETHERLANDS: J. Kater E.O., Ouderkerk a.d. Amstel. NEW ZEALAND: Richardson McCabe & Co., Ltd., Wellington, etc. PAKISTAN: The Karachi Radio Co., Karachi, 3. SOUTH AFRICA: Arthur Trevor Williams (Pty.), Ltd., Johannesburg, etc. CENTRAL AFRICAN FEDERATION: Arthur Trevor Williams (Pty.), Ltd., Salisbury. THAILAND: Vichien Phanich Co., Ltd., Bangkok. TRINIDAD AND TOBAGO: Thomas Peake & Co., Port of Spain. TURKEY: Dr. H. Salim Öker, Ankara. URUGUAY: Ciuna Ltda., Montevideo. U.S.A.: Hackbridge and Hewittic Electric Co., Ltd., P.O. Box 234, Pittsburgh 30, Pennsylvania. VENEZUELA: Oficina de Ingenieria Sociedad Anonima Caracas.

C- TO A-LICENCE APPEAL

Merchandise Transport Case Opens

HEARING of what promised to be a protracted appeal by Merchandise Transport, Limited, against the refusal by the Metropolitan Licensing Authority (MODERN TRANSPORT, June 25) of its application to add to its A-licence 119 vehicles, Luton vans, at present on C- or C-hiring licences of its parent company, the furniture manufacturer Harris Lebus, Limited, Tottenham, opened before the Transport Tribunal on Monday. For the appellant, who was confronted by the B.T.C. and 60 other respondents, Mr. C. R. Beddington submitted that the licensing authority had overstressed the return load factor and had not confined himself to the evidence in arriving at his decision. Mr. Beddington quoted from the licensing authority's observations to the Tribunal in support of his contention that Mr. Muir had unreasonably doubted the "genuine desire" of Harris Lebus to reorganise its transport arrangements by placing all vehicles on A-licences.

Mr. Muir had said that there was a difference between a customer-haulier relationship and a parent-subsidiary relationship (as existed in this case). There was, he said, only one point of view in Harris Lebus and Merchandise Transport—that of Harris Lebus, which was to increase efficiency. Despite what had been said in evidence it was inescapable that the overwhelming desire behind the application was for Merchandise Transport to carry return loads on the 119 vehicles. That was why he (Mr. Muir) had described the expressed desire (economy and simplification of operation) as "less than genuine."

Desire of Customer for Change

Mr. Beddington, on this aspect, submitted that Mr. Muir had misinterpreted the significance of the term "genuine desire" as enshrined in the Allison appeal. If a customer gave evidence of his desire to change his method of transport the licensing authority should question him only on the facts, not the underlying reasons. The reasons for wanting a change were not relevant. He quoted the Rumble, King and Nichol decisions in support of these contentions. In Nichol the Tribunal had said that the mere fact that a customer supported a change, from contract A- to ordinary A-licensed transport, was a good ground for a grant. The Reed Transport case had also pointed the way, even though it had foundered on lack of evidence. Sir Hubert Hull, president of the Tribunal, interjected that it was shown in the Reed case that most of the return loads were for internal use. He put it to counsel that if an applicant in the position of Merchandise Transport held itself out to carry a large number of return loads of general traffic it must expect opposition from other hauliers, if on the other hand only a small number of return loads was going to be carried it was perhaps only entitled to a B-licence.

On the return-load aspect, Mr. Beddington suggested that there had only been need for him to lead evidence on the outward loads, which were almost entirely new furniture. The licensing authority, he submitted, was bound to consider evidence of outward loads alone, although he might consider objections to return loading. The president said this was putting the position too high. Counsel quoted Cattell, Gair and Federated Conveyers in support of his contention that it was not necessary to establish need for return traffic. Indeed, in this case, where vehicles ran to all parts of the country, it would be impossible to give specific evidence of return loads.

Attitude to Return Loading Objections

He was asked by the president what course should a licensing authority adopt if a return loading objection were pressed, ignoring for present purposes the complication of other traffic areas? Counsel suggested that the authority could only weigh each such case on its merits. At the close of the hearing on Monday Mr. Beddington was asked by the president to prepare a "balance sheet" showing where the balance of advantage lay in respect of (a) Merchandise Transport; (b) other hauliers; (c) Harris Lebus, and (d) traders generally, of an A- versus B-licence grant.

At the opening of the appeal, Sir Hubert Hull strongly criticised the form of the original application, which indicated that all the vehicles were in the possession of Merchandise Transport. He was surprised, he said, that something so obviously wrong should have been entered in a form drawn up presumably with expert guidance. During discussion later in the hearing, the president said that ever since he had taken office he had fervently hoped that the question whether an applicant for an A-licence could properly be granted a B-licence instead would go to judicial appeal. He still hoped to see this "before I retire," but there was some doubt whether an appeal could be brought on this issue. The B.T.C. and 58 respondents in the Merchandise Transport appeal are represented by Mr. D. L. McDonnell. The appeal enters its third day on Monday next.

★

GEORGE MORTIMER PULLMAN

(*Continued from page* 8)

of the Northern states. The car was exhibited in company with the latest Pullman vehicles at the World's Fair in 1893, after which it was allowed to rest until the war with Spain taxed the country's transportation facilities to the limit. Then *Pioneer* went to work again, as a tourist sleeper, and, as such, many a regular and volunteer soldier of that era made its acquaintance. Its last use was to help to carry the Forty-Third Infantry across the continent on their way to the Phillipines to quell the rebellion there.

When *Pioneer* was finally condemned it had a travel record equal to a trip 40 times round the world and had averaged 50,000 miles annually in runs between Chicago and St. Louis. At least 25 years had been spent in actually travelling on an alternate-day regular trip of 283 miles. But as the 20th century dawned its working life was over and it was pulled into the "bone yard" at Pullman, Illinois, for breaking into firewood and scrap iron.

(*To be continued*)

NEW TUBE CARS FOR LONDON TRANSPORT

This new type of tube car
is now being supplied
to the L.T.E. by Cravens Ltd.

New features include :—
Revised layout of seating.
Large Windows.
Wider Vestibules.
New ventilation System.
Two Traction Motors per Bogie.
Plastic Interior Panels.

CRAVENS LTD.
SHEFFIELD

Prototype L.T.E. Tube Trains

(*Continued from page 9*)

cream ceilings are of pegboard type material, which reduces the reflection of sound, making travel conditions quieter for passengers. Above the pegboard is a thin plastics sheet holding glass wool under the underside of the roof.

Draught screen units at the sliding doorways have been formed in reinforced plastics (glass fibre) mouldings. A special feature is the setting back of the draught screens from the sides of the door openings by a few inches, so that the doorways will be less obstructed by passengers standing with their backs to the screens than in existing Underground cars. This feature, which will increase the effective width for passenger movement into and out of the cars, gives more room for standing passengers at the expense of only two seats per car. It should reduce the time spent at stations in peak travel hours.

Traction Control Equipment

The P.C.M. type camshaft control equipment controls four 300-volt motors, the two motors in each bogie being permanently in series. The A.E.I. designers have achieved this without increasing the overall dimensions of the standard equipment case as used on both tube and shallow line stocks to house the two-motor equipments for 600-volt motors. The maximum allowable depth of the equipment case varies from only 14¼ in. at the inside to 17¼ in. at the outside, where the clearance is greater. The new equipment can deal with a maximum RMS current of 312 amperes, the corresponding maximum figure for a two-motor equipment being 200 amperes. The four-motor equipment is basically similar to the standard two-motor equipment with series-parallel control, but has contactors and cables of increased rating where necessary to deal with the heavier currents.

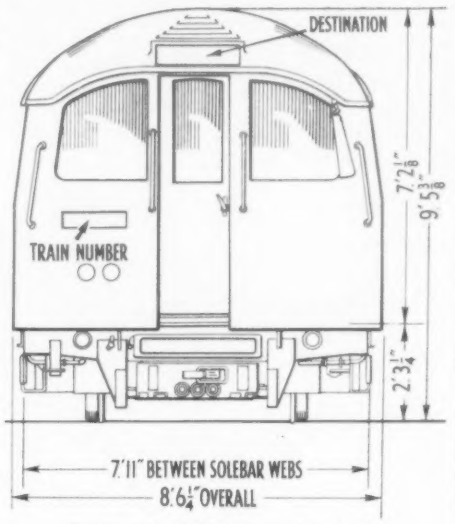
Interior of driver's cab on prototype motor coach

As a precaution, wheel spin protective devices have been fitted to safeguard against the serious consequences possible should the wheels driven by one motor of a pair begin to spin. There are two differential voltage relays—one for each pair of motors. Each relay has two coils, each coil being connected across one of the pair of motors in a bogie. Should wheel spin occur on one motor, the voltage balance across the pair of motors will be disturbed, the relay will operate and open the line breakers. The camshaft of the control equipment will then return to the "off" position, after which the equipment will notch up again automatically.

Power Cabling

Because of the increased current demands on the main equipment, it was necessary to use power cables of a larger copper section, but with no additional space available the overall diameter of the cable could not be significantly increased. An alternative insulating material was therefore sought, which could have a reduced radial thickness without sacrificing dielectric strength. Several alternatives were considered to the present standard cable, which has natural rubber insulation and flame-proof cotton braiding, and it was eventually decided to use a composite rubber-neoprene cable (known as R-N cable) which has a natural rubber dielectric with a neoprene sheath. Although this new cable has lower specific insulation resistance than the flame-proof braided type, it gives a higher overall insulation resistance on a complete car because of the elimination of the flame-proof braiding.

In addition, the neoprene sheath is expected to have improved resistance to abrasion, ozone and oil. To obtain comparative data on the insulation resistance of complete cars and gain experience with the new cable, half the motor cars and half the trailer cars are wired with R-N cable, and the remaining half with the standard flame-proof braided cable. The power cabling runs, the run of the motor leads, and the accommodation of the motor connection boxes with the use of four motors on a tube stock car of modern design have presented problems, particularly in the confined area around the bogies. Several arrangements of motor leads and connection boxes were tried at Acton in mock-up form before a practicable arrangement was devised. Following the practice adopted on the 1959 tube stock, all power and control leads within the equipment case have crimped connections.



Front end of Craven motor coach

Traction Motors

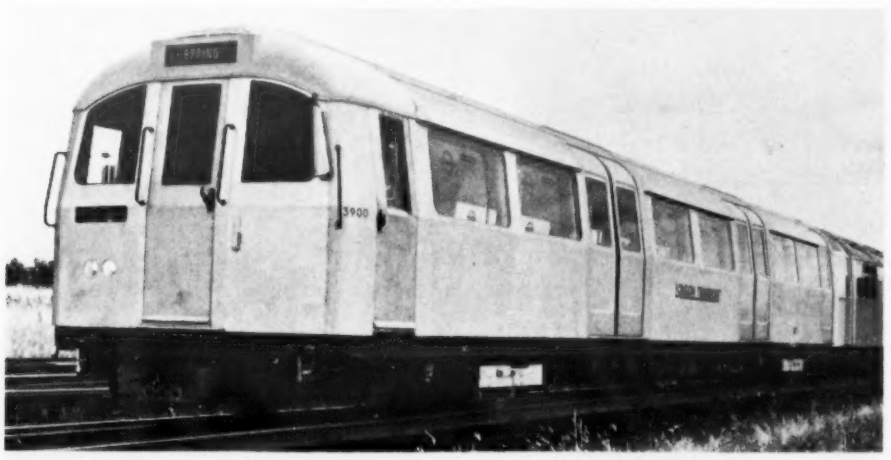
The traction motors, of type LT.113, are the first 300-volt motors to be used by London Transport, apart from those tried for experimental purposes. They have a continuous rating of 60 h.p. at 66 per cent field. Apart from this feature, they are of the normal axle-hung nose-suspended type. Following the practice of the 1959 tube stock cars, the nose is mounted on the bogie between resilient pads. The pinions are removable by the oil injection method. The motor leads are of a rubber-neoprene cable with an additional thickness of neoprene for mechanical protection.

A fundamental change has been made in the method of generating the low-tension supplies for a.c. fluorescent lighting and 50-volt d.c. auxiliaries. Previously, London Transport has used a 600-volt motor-generator set with a 50-volt d.c. output, and the a.c. supply at 115 volts 850 cycles per second for fluorescent lighting was obtained either by a pole-face winding on the generator, or latterly by a separate overhung alternator on the motor-generator set. On the new trains a motor-alternator set is used, the alternator being of the inductor type with an output of 6 kW at 220 volts single-phase, 850 cycles per second. The output to the main fluorescent lighting at 115 volts is by step-down transformer. The 50-volt d.c. supplies for battery charging, control, brakes and doors and miscellaneous supplies are obtained from a separate winding on the main transformer, feeding a germanium full-wave bridge rectifier. The usual 46-volt lead-acid battery is connected to the rectifier terminals via a smoothing choke to protect it from the effects of voltage ripple. Smoothing is also provided for certain circuits. A new design of static voltage regulator has been provided, with no moving parts, in place of the vibrating carbon type previously used, which, though of proved reliability, requires considerable maintenance. The main transformer, rectifiers, smoothing chokes, and static regulator have been designed as a composite unit which can be removed from the auxiliary equipment case as one assembly. The main lighting is provided by 4-ft. 40-watt fluorescent tubes underrun at 32 watts, mounted in two continuous lines of eight lamps along the monitor rails of the cars.

(*To be continued*)

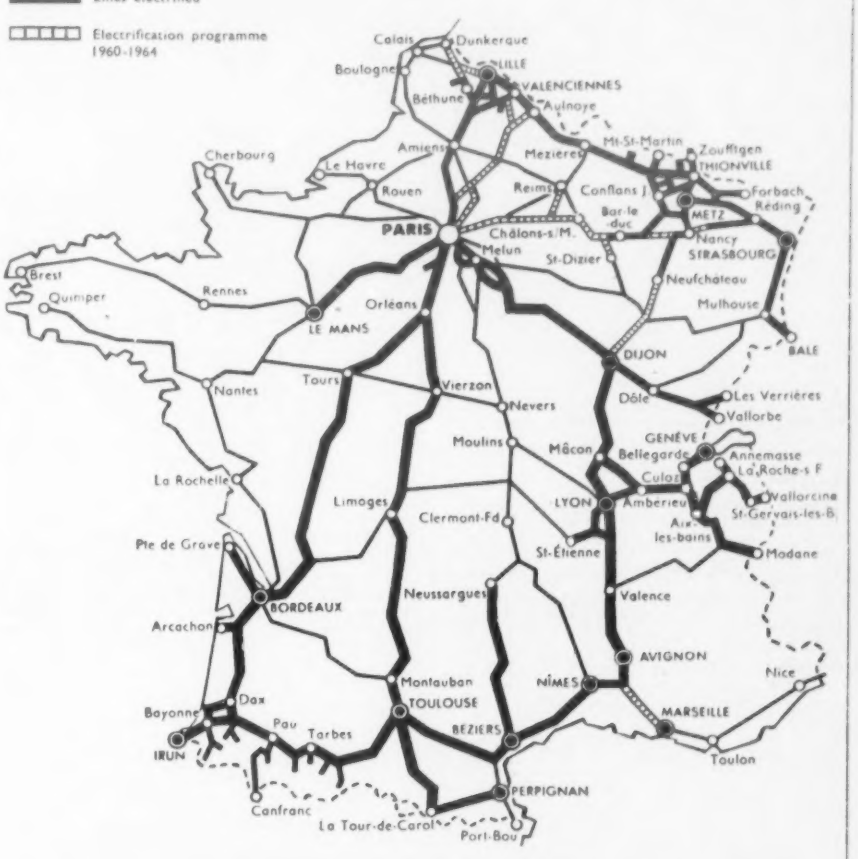
THE PRINCIPAL CONTRACTORS

Car bodies and bogies	Cravens, Limited
Traction control equipment, motor generators, auxiliary contactors, speedometers	Associated Electrical Industries, Limited
Traction motors, fluorescent lighting control gear and car heaters	General Electric Co., Limited
Air brake equipment	Westinghouse Brake and Signal Co., Limited
Air door equipment	G. D. Peters and Co., Limited
Car doors	Dialoy, Limited
Auxiliary electrical equipment	Patent Lighting Co., Limited
Axleboxes and suspension bearings	Hoffman Manufacturing Co., Limited
Loudaphones, etc.	Clifford and Snell, Limited
Batteries	Pritchett and Gold, Limited
Lighting fittings and auxiliary equipment	Benjamin Electric, Limited
Automatic couplers and disconnecting units	A.E.C., Limited



Prototype tube stock built by Cravens, Limited, of Sheffield, for London Transport Executive with A.E.I. electrical equipment and now going into service on the Central Line

ELECTRIFICATION on the FRENCH RAILWAYS



195 MORE MILES ELECTRIFIED IN 1960

PB 76 B

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Since 1938 AEI have supplied the bulk of the Control Equipment on London Transport Trains and over 2400 camshaft equipments have been supplied or are on order.

Please send enquiries to AEI Traction Division, Trafford Park, Manchester 17, or to your local AEI Office.

AEI **Associated Electrical Industries Ltd. Traction Division**

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Candidates should be between 21 and 45 years of age, of good educational standard, and be capable of handling routine correspondence. The ability to type would be an advantage.

Applications forms, which must be returned by December 9, 1960, can be obtained from:

The Manager,
Staff & Labour Relations Department,
Richard Thomas & Baldwins Limited,
Spencer Works,
Llanwern, Newport, Mon.

[Other Classified Advertisements appear on page 19]

A Subscription to
MODERN TRANSPORT
will keep you in touch with all British and Foreign transport developments

STEEL FIRM DEVELOPMENT

Dorman Long £36M. Programme

THE major capital expenditure programme undertaken by Dorman Long and Co., Limited, of over £60 million since the war has been aimed primarily at establishing advanced techniques at all stages of manufacture in the production of a full range of rolled steel structural sections. This programme included completion in 1958 of the universal beam mill at Lackenby. In addition to the £7 million expenditure announced in July, the company is now to embark on further extensive development expected to cost £36 million to modernise much of its rolling mill facilities for other products. Overall production potential will be increased by a further 400,000 ingot tons per annum to 3,000,000 ingot tons.

The objective of the new Stage IV programme is not primarily expansion of output by the installation of additional new units but the attainment of higher efficiency and productivity over a wide range of operations. While replacement of plant by new units inevitably raises production, the main increase in finished outputs will be in light and flat products where a rising national demand is expected.

Wider Universal Plate

The initial part of the programme includes a new primary mill at Lackenby for the production of 22,500 tons of slabs and blooms a week from ingots of up to 20 tons in weight. At Lackenby will be built also a new high-capacity universal plate mill to replace the existing mill at Redcar—the only one in the United Kingdom. Universal plate up to 42 in. wide has been a speciality of Dorman Long for more than 40 years and the new installation will allow for an increase in width and improved quality.

A new wire rod mill of high capacity to roll coiled bar from ⅛ in. dia. down to five gauge will be constructed at Lackenby. The existing rod, bar and narrow strip mill adjoining the Lackenby beam mill will be modified by the provision of additional cooling facilities and extra stands for the production of larger diameter bars (over ⅜ in. dia.) in coil and straight lengths. Present facilities for rolling narrow strip up to 12 in. wide at this mill will be retained, but products will be taken to a more highly finished stage.

To provide the increased billet requirements arising from the installation of the new rod mill, it is proposed to add to the semi-continuous billet facilities recently completed at Lackenby. A start will be made immediately on these earlier projects in the programme, coupled with the necessary ancillary services. After completion there should be a steady build-up of rolling rate on these new units but full outputs will take some time to achieve. Projects in the Stage IV programme concerned with increasing iron and steel making capacity will be phased in later.

★

EXTENDED SURFACE TUBE

Nuclear Development Aids Industry

ORIGINALLY designed to meet exacting requirements in nuclear power stations, extended-surface tube is now finding many applications also in the oil, chemical and power-producing industries and holds promise for all fields of engineering practice involving the transfer of heat from one medium to another. Its advantages over more traditional means of heat transfer are particularly valuable where high rates of transfer are required and where the size of heat-exchange plant must be kept to a minimum. Several different types of extended-surface tube, in a variety of sizes and materials ranging from mild steel to stainless steel, are now in regular production by companies of Tube Investments, Limited, and the range is continually being increased. The tubes are available in a variety of manipulated forms as well as in straight lengths. Tube Investments, Limited, The Adelphi, London, W.C.2, has published an illustrated brochure describing the various forms of tube available.

CHAIN FERRY LAUNCHED

For Cornwall County Council

AT the Woolston yard of John I. Thornycroft and Co., Limited, Southampton, there are now building two diesel-electric chain ferries for the Cornwall County Council. Consultants to the County Council are Messrs. Graham and Woolnough, Liverpool. The first of these ferries was launched on October 5, by Miss E. Evans, an employee of the builders with over 40 years' service; it is expected to be completed in a week or so.

Launch of diesel-electric chain ferry for Torpoint—Devonport operation

The second ferry will probably follow about a month or so later. These two vessels are to replace the existing steam ferries at Torpoint and will normally operate a 15-min. service between Torpoint and Devonport.

Of robust construction, these ferries have been designed to carry vehicles of all the usual types as well as provide spacious accommodation for a large number of passengers. Special attention has been given to the design of the hinged prows to enable long wheelbase vehicles, such as motor coaches, to embark and disembark fully laden without the use of wheelboards

The main electrical machinery was supplied by the General Electric Co., Limited.

LEADING PARTICULARS

Length of hull	102 ft.
Length of hinged prow each end	40 ft.
Length O.A.	182 ft.
Breadth of hull	54 ft.
Breadth of traffic deck	32 ft.
Depth of traffic deck at centre	9 ft. 6 in.
Depth of main deck at side	10 ft.
Depth of upper deck at side	18 ft.
Mean loaded draught	5 ft. 9 in.
Speed of chain wheels	20 r.p.m.
Speed of ferry	630 ft. per min.

★

LEEDSALL DUMP TRAILER

By Robert Hudson

THE hydraulically operated 7 cu. yd. Leedsall dump trailer has been designed by Robert Hudson, Limited, Leeds, for use with the Fordson Major tractor and similar units. Compared with lorry-mounted dumpers of similar capacity, the tractor-trailer combination represents a considerable saving in initial costs. It has been designed to give a high all-round performance and has a unique type of drawbar linkage which permits complete articulation in all directions with a 90-deg. swing on each lock. The drawbar, which has a universal coupling and is subject to patent application, allows the combination to articulate within the stability of each unit and gives a turning circle of 30 ft.

The body is in ¼ in. steel plate, welded throughout, and is reinforced by $\frac{3}{16}$ in. thick channel-section stiffeners. Struck capacity of the body is 5 cu. yd., heaped capacity is 7 cu. yd. and the load capacity is 20,000 lb. The chassis is of A-form construction, 9 in. by 3 in. rolled steel channel. The wheels of the trailer are fitted with 14.00-24 12-ply tyres of the earthmoving type and have cast-steel hubs, taper roller bearings and Girling air brakes fed by a compressor on the tractor.

The overall length of the combination is 22 ft. 10 in., wheelbase from the tractor rear axle to the dumper axle being 12 ft. 3 in. The height of the body is 8 ft. (11 ft. 8 in. in the tipping position) and the overall width is 7 ft. 6 in.

★

PHENOLIC RESIN FOAM

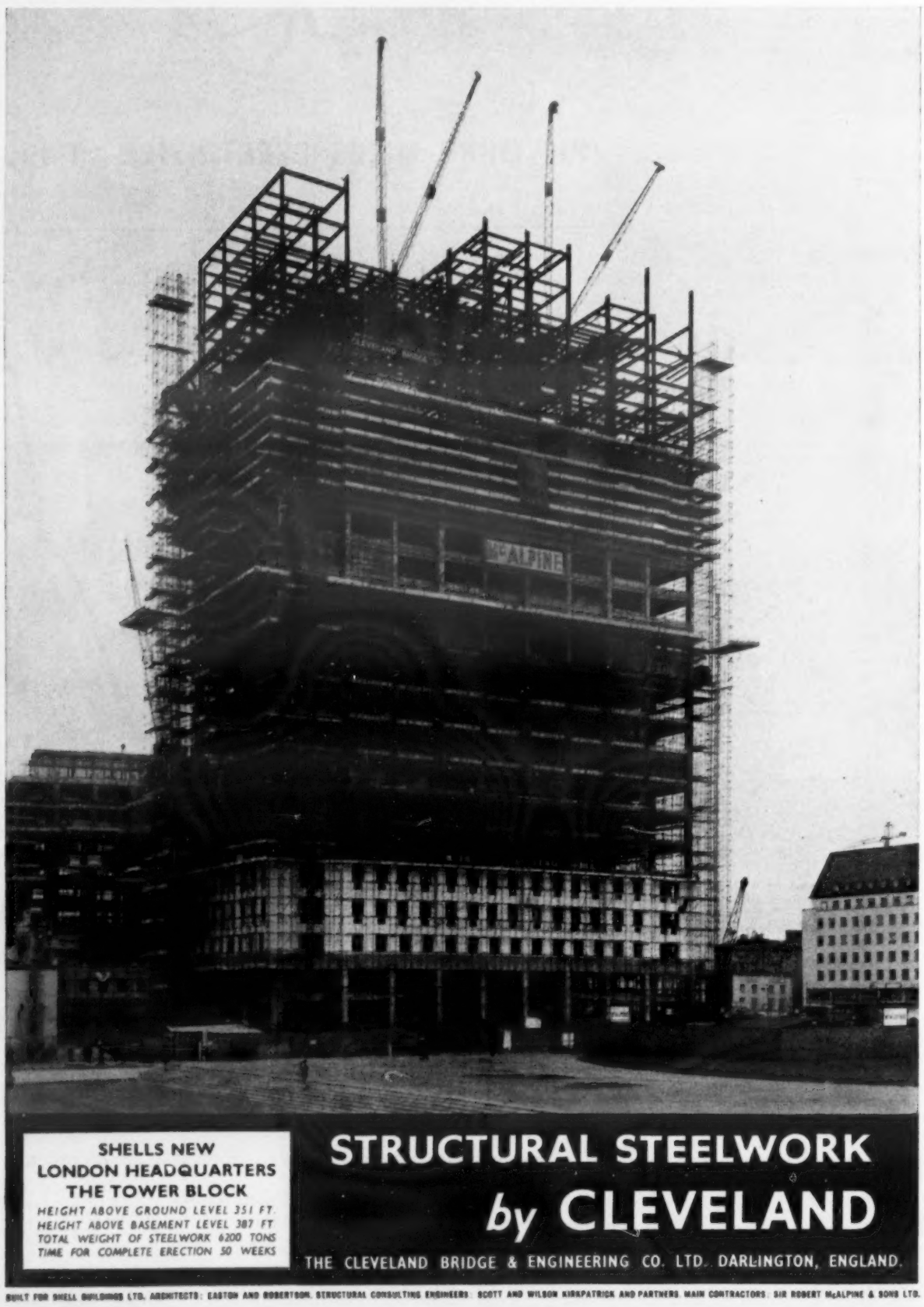
Fire-Retardant Non-Melting Insulant

PRODUCTION of phenol formaldehyde resin foam by a continuous process has been started by Isofoam, Limited, Kingston Wharf, Shoreham-by-Sea, Sussex. The product is being tried out as an insulating material in several forms for building use and could have possibilities in ships and transport vehicles. Its chief significance is that, unlike other plastics foams, the material is not only non-inflammable but does not melt in intense heat.

Blocks of foam 2 ft. wide and 12 in. deep are formed by mixing the phenol fomaldehyde resin at a critical temperature with a chemical activator in a small head, of the company's design, and depositing the foam on to paper covering a polyvinyl chloride belt. The belt takes 17 min. to complete its 32-ft. pass, but the block is hard enough to handle at 10 ft. from the mixing head. A bandsaw slices the block horizontally to the thickness required, the whole operation being automatically controlled.

The foamed material so produced has a K value of 0.24 and is currently offered as an insulant core for laminated boards, insulation for underfloor warming, panel warming and dry-construction roofing. In the production of laminates, wet polyester-glass fibre plastics will bond itself to the phenolic foam on which it is placed, but resorcinol or epoxide adhesives are needed to laminate phenolic foam to asbestos board. Panels of the foam are even being used as unsupported curtain walling to which plaster is directly applied. A granular form of the insulant is also available for use as a loose infilling, competing with granulated micaceous material.

The standard product—with a density of 3.5 lb. per cu. ft. and a thermal conductivity of about 0.24—is capable of considerable modification by the use of different basic resins, activators and blowing agents and different foaming techniques. Isofoam can produce from resins now becoming available a foam of only 2 lb. per cu. ft. density and with a fine "grain" or porous structure. This has, the company says, exceptionally good acoustic as well as thermal insulating properties. Another innovation well out of the experimental stage is a semi-rigid phenolic foam, close-textured and dense, produced by a chemical modification of the mixture.



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CONSUMER GOODS DISTRIBUTION

Aspects of Service

*By MEDWYN ORMEROD, M.B.E., M.Inst.T.**

CONSUMER goods distribution is a subject bringing together people concerned with production, marketing and selling, and on the other hand, transport people whose specialist interests embrace commercial aspects as well as technical, movement aspects as well as handling ones. The advertising man is in the background, so is the packaging expert. Still more portentously, maybe, there looms the figure of the chief accountant. The distribution job is part of a wider picture, not a private world of its own, but if we transport people recognise this and see ourselves as members of a team, we must claim for ourselves a share in that team's collective decision-making. This, I think, is important at this time to the transport man in industry. His importance is more widely recognised than before.

Crudely—there is much more in it than this these days—delivering to shops is one thing and delivering to wholesalers is another. Of course, one may or may not be dealing in terms of national selling and distribution. Again, geographical emphases, both of choice and of the facts of density, may suggest different arrangements in different areas. In selecting one's classes of outlet, one must have regard to how much more one can hope to sell by this means compared with that, what one's various margins will be, and what one's comparative distribution costs will be.

Not Merely the Delivery Cost

It is not only a matter of delivery cost. The marketing plan may well create an interest in precisely how the goods are displayed in the shop. The transport man can perhaps couple the simpler forms of display work with the delivery job. His local depot may provide a natural focal point for orders to be received and customers' invoices prepared—perhaps for their accounts to be maintained also. Often it is the natural base for the representatives to work from, the natural address to appear in the telephone directory. If the economics of physical distribution have led to the creation of a private depot system—and I am not saying this is always the right thing to do—consideration should be given to what other services this system might usefully and advantageously provide.

I have offered examples, only, of features of the distribution machine which may influence decisions in wider spheres. There could be many others, by no means conditional on the existence of private depots. The distribution services available from public sources, for direct or for through-depot distribution, the ways in which specialised vehicles can be used, are various and far from limited to the straightforward fetching and carrying side of life, even though that is their main objective and for us, as transport men, the main concern.

Charging

For long years the charging methods followed by the railways, and by road haulage, have themselves exercised a considerable influence on the channels through which manufacturers have sought to reach their markets. I am thinking of the advantages accorded to bulk despatches and the incidence of charges for splitting, and, of course, for local storage and cartage. At the present time something like a revolution is going on in the organisation of our retail trades and the wholesale and supply machine behind them. The practice and relative significance of independent shops, multiples, co-operatives, supermarkets, etc., are subject to speedy change. Wholesaling shows new organisational features such as group operation and buyers generally are quite commonly joining together. There is a new look to the task of selecting the points of contact with the trade and categorising them as to importance, frequency, etc. All this has a considerable bearing on distribution practice and will strongly influence the long-term physical pattern of distribution services.

The working out of the processes which I have indicated is, and will continue to be, one of the chief influences on the shape of our public and private delivery and cartage services throughout the country. The larger man has the better chance of achieving a tailormade service flexible to changing circumstances, and greater incentives to do so. We shall see in due time, I have no doubt, considerable further and more fundamental rationalisation of the local road services provided by the railways, for both parcels and goods smalls, and by B.R.S., and maybe more joint working as between the B.T.C. services and free enterprise road haulage.

Points for Consideration

Two points on this, I respectfully submit, should be borne in mind by the authorities concerned. The more sophisticated services which can be provided privately will attract firms increasingly to C-licence operation for local distribution unless rather more comparable services can be offered publicly—the public services have the advantage of putting separate streams together to form a heavier traffic flow, but service counts as well as cost, and sometimes much more. Indeed service can perhaps be valued in cost terms and in these it may loom quite large. But the tanker and furniture removal fields, amongst others, exemplify the possibilities of specialisation in public transport. The private (including collective) provision of local distribution services is by no means inconsistent with the use of rail and other public services for the big ton-mileage work from the factory to the local centre. Maybe relief from the cares and costs of local cartage is even helpful to the B.T.C., always assuming that what is left can be rationalised (and all of us must recognise the many difficulties here).

Let me not seem to imply that the service aspect is mattering more to the exclusion, or anything like it, of cost considerations. People running transport are likely to find themselves with a wage and salary ingredient in their costs running at 50 per cent or anyway a high level, whilst to their production colleagues this ingredient is relatively much smaller. The urge, very properly, is to offset higher wage costs by higher productivity. But if employers forget to maintain parity of treatment for their transport staffs they will soon receive sharp reminders, and operators who have already mechanised their handling and loading will be up against worsening road conditions, increasing unloading restrictions, and as yet probably only minor possibilities of mechanising the unloading operation, as they look for further productivity.

Practical Consideration

Apart from the wider planning, "comparative economies and profitability" aspects I have mentioned, practical considerations arise like co-ordinating delivery schedules with representatives' callage, and making provision for urgent orders. Going back to the public providers of transport, our own S.P.D. organisation and its use, not, by the way, compulsory or even universal by Unilever companies, creates a situation in which the public carrier can compete for attractive regular business moving in bulk between a limited and largely static combination of major points of loading and discharge which are equipped to perform these operations rapidly by mechanical means. The "messy bit at the end," the detailed package by package part of the business, is removed behind the scenes. The load looks after itself; where wagons can move sealed from private siding to private siding, it hardly matters what is inside them, apart, I suppose, from the irksome consideration of rating!

Depots are a means to an end, or at least a combination of ends—they are not invariably the right thing to have; they represent one method amongst several from which a choice must be made. Here are some of the considerations to be weighed up before you go out for depots:

(*a*) The cost, if they are to be private ones, of building or renting—indeed the considerable difficulty nowadays of getting suitable sites or premises;
(*b*) whether the number of different packs compared with the tonnage throughput is consistent with economically maintaining uncommitted stocks (representative of the range) at whatever number of locations is involved—capital tied up in stocks is an important feature and a depot system may add to it, though not of course if manufacturing considerations mean that similar stocks would anyway have to be held centrally;
(*c*) going on from there, whilst quite obviously goods are by and large manufactured at a rate closely related to the rate at which they are sold, if one has depots one does not need to view this in quite such a day-to-day sort of way. Without holding stocks at factories, one can nonetheless ignore seasonal differences between production and sale—or the effects of short production runs—and push the goods out to depots where these unevennesses can be spread out. Ideally, too, one can load direct from production, and limit one's handling operations; but, of course, various compromises can be considered;
(*d*) next, the major question of whether there is scope for economy in the long-distance movement from factory or other source (ports may be concerned) to the areas of distribution, through the bulking of otherwise small lots, and their handling in unit loads and their control generally on a regular, large-scale basis—this is often the key to the whole affair;
(*e*) whether the burden of individual documentation, handling and maybe labelling at a single point of dispatch is manageable—in some cases it simply is not; (this is a matter of how many outlets have to be served, in terms of how many packs, and what size of unit delivery);
(*f*) what supplementary services at depots can be provided and exploited; exactly what forms and standards of customer service are required—there may be critical considerations of timing of delivery apart from services to be performed by the driver. The availability of stocks right in the market area may be an important insurance against customers' urgent needs and delays in the pipeline.

What Will Be Most Wanted

I had better allow myself a "miscellaneous" heading also, to take care, for instance, of special features connected with the goods, such as their stock life and, on the other hand, the possibilities there may be of using lighter and cheaper packaging where detailed handling is under domestic control. Clearly the changes going on in retail organisation, and in the supply machine behind it, have a significant bearing on these considerations. What sort of service are one's various classes of customer going to value most? Will the bigger people appreciate being relieved of stock holdings at their central premises (or in stores they rent for the purpose) and the need to handle and deliver in detail from these?—obviously they will be thus relieved if deliveries are made to individual branches and shops. Are circumstances (including developments in buying practice) combining to demand more frequent, smaller, deliveries?

There are certainly other ways of doing the job and a variety of direct, railhead and "common user depot" services to choose from. Most users, indeed, surveying the whole of their problem over areas of widely differing geography and maybe even relative sales density, will use a combination of different arrangements to give their total coverage. This certainly happens within Unilever. One advantage of a single system is simplicity—if one suddenly wants a product held up, everywhere, for repacking, perhaps, there is only one button to press. We certainly find with a private depot system that valuable opportunities are opened up. Specialisation can be profitable in strictly transport terms, through the close organisation of routes and load-planning, knowledge of delivery points and what they entail, and vehicle design. In the right context this can mean higher output and lower cost.

Importance of Service Factors

But the service factors are important too—care of the goods, the interest of the indoor and delivery staff in the fortunes of the products and their appreciation of the value of their own customer relations. A recognised livery and uniform can become associated with standards of service. Active, imaginative staff communications practice is highly important in these connections. This is a difficult thing because time is not on one's side, products fare differently and need different support in different areas, local attitudes are different and it is tempting to be too voluminous in what one writes, says or displays. We reckon to keep the transport thinking closely linked with the marketing thinking, and as a result we participate actively in promotional schemes, product launches and the supporting administration, as well as being consulted in the early stages when something new is contemplated.

Some users, because of the nature of their goods, or their selling methods, will send out bulk loads to be transhipped at local centres direct to distributive vehicles—without, that is to say, holding local stocks, although usually there is then a problem connected with such supplies as are not immediately sold. Indeed, under all these arrangements, the "casualties" which arise in practice may constitute a serious cost factor, measured in terms of product value and not just the transport element. Orders lost through delays in transit, long-distance weather or breakdown hazards form one casualty class; goods which have to be returned from local stocks as out of warranty constitute another. There are no ready-made answers.

* Abstract of a paper to the Sussex Group of the Institute of Transport on November 21. The author is chairman of S.P.D., Limited.

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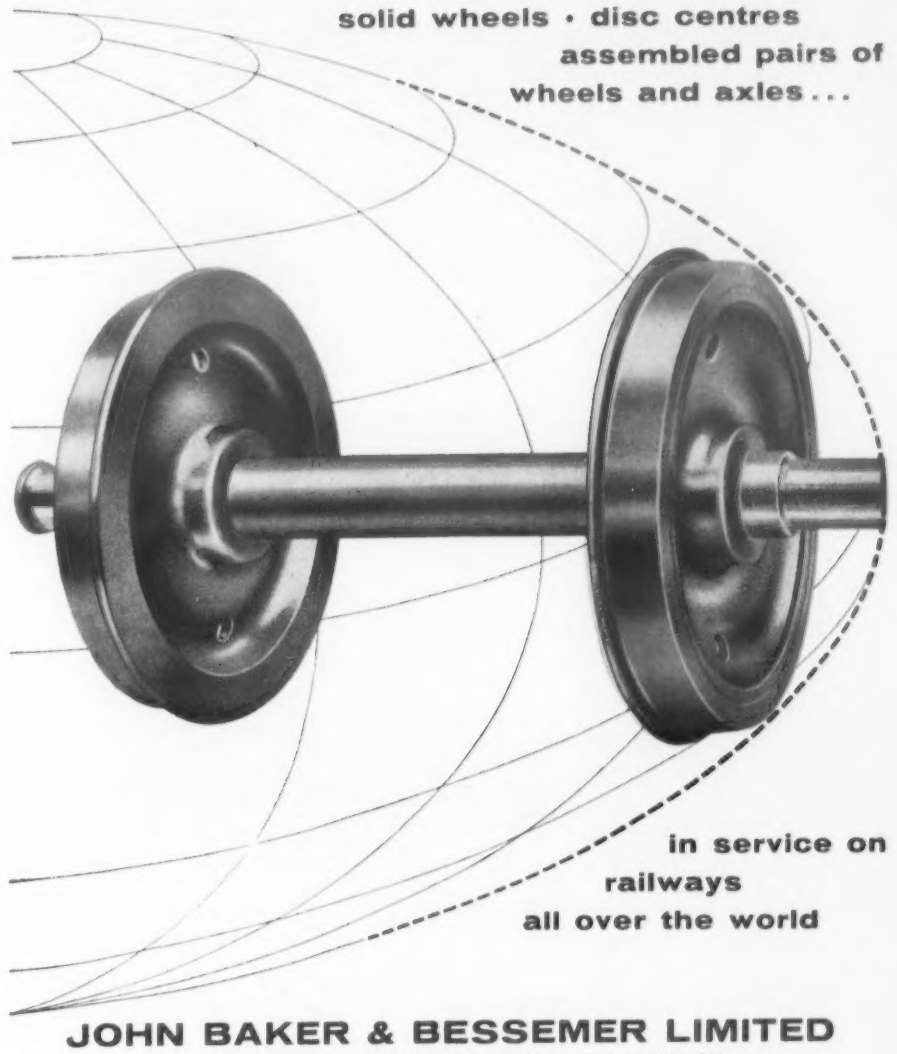

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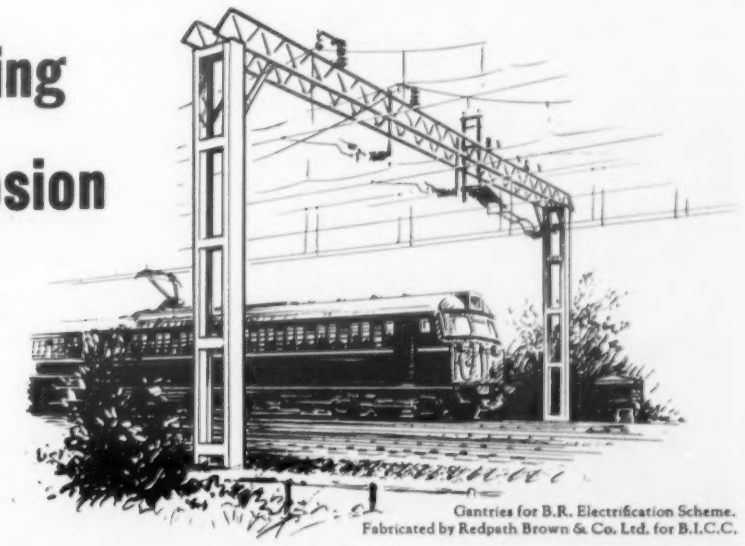

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Tenacious and durable, hot galvanizing is still the most effective and most economical means of combating rust.
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(LONDON) LTD.

WOOLWICH ROAD, LONDON, S.E.7
GREENWICH 3232 (22 LINES) G/4

Great Eastern Electrification

(Continued from page 3)

This scheme was adopted for these reasons:

(*a*) The restricted space available for underframe mounted equipment and the desirability of using a minimum amount of oil immersed apparatus made low tension tapping essential.

(*b*) The most economical arrangement of rectifiers and transformer is obtained with bridge connection at an output voltage such that it is desirable to connect two motors permanently in series. Use of the bi-phase circuit could halve the number of rectifiers, but the advantages of this would be outweighed by the larger transformer and duplication of the tapping switch contacts and choke which would result from its adoption. The further alternative of a single bridge circuit using four rectifiers with four motors in series is unacceptable because of its poor adhesion characteristics, inability to operate with half the motors cut out in the case of a defect developing, and high secondary voltage.

	Three-coach unit	*Four-coach unit*
Maximum axle load	16·7 tons	16·7 tons
Maximum service speed	75 m.p.h.	75 m.p.h.
Balancing speed on level tangent track	72·3 m.p.h.	67 m.p.h.
Acceleration on level tangent track	1·35 m.p.h./sec.	1·1 m.p.h./sec.
Average accelerating tractive effort	21,600 lb.	22,200 lb.
Continuous rating at wheel in weak field:		
Tractive effort	7,000 lb.	
Speed	43 m.p.h.	
Power	800 h.p.	
Total weight of electrical equipment	23·4 tons	23·5 tons

(*c*) The scheme incorporates the following features considered essential for service on multiple unit stock of this nature:—

(i) Speedy operation through the sequence, particularly when returning to the off position.
(ii) Avoidance of backward tapping when switching off.
(iii) A small number of transformer tappings.
(iv) Reduction of momentary voltage drops during notching to negligible proportions.

(*d*) The scheme is a compromise between the simplicity of resistance control at constant voltage and the complete elimination of resistance steps, in that the introduction of some series resistance and reactance into the circuits during notching improves current distribution between motors and reduces the number of taps and steps required, without making the adhesion characteristics unacceptable for multiple-unit service.

Control of the direct current circuits follows established d.c. practice, with the addition that isolation of a pair of motors also cuts out the associated rectifiers by opening their excitation circuits. Movement of the master controller causes the tapping switch to progress step by step to the appropriate position under the control of a current limit relay which regulates the lifting of the pawls.

Four-Coach Unit	*Unladen weight tons*	*Laden weight (all seats occupied) tons*
Vehicle		
Battery driving trailer	35·9	40·9
Motor coach	54·9	60·9
Non-driving trailer	31·0	36·0
Driving trailer	32·2	39·0
Total	154·0	176·8
Three-Coach Unit		
Battery driving trailer	34·1	39·1
Motor coach	54·2	60·2
Driving trailer	30·8	37·6
Total	119·1	136·9

A 240-volt tertiary winding on the main transformer supplies the train heaters, battery charger and auxiliary machines with the exception of the auxiliary compressor, which, together with the lighting and control circuits, is fed from a 110-volt alkaline battery. The battery charger is a transductor controlled rectifier unit with voltage regulation by a closed loop control. The main compressor is driven by a d.c. series motor supplied through a selenium rectifier and the transformer and rectifier pumps and fans by single phase capacitor motors.

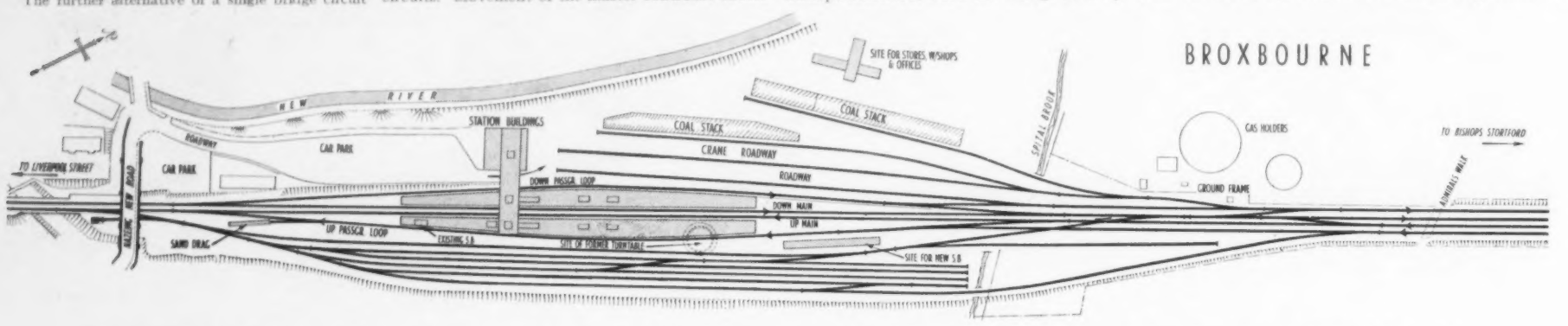
The exteriors of the electric multiple-unit trains serving the North East London lines will receive a daily water-wash, in the carriage cleaning sidings at Enfield Town, Chingford and, shortly, Hertford East. Carriage cleaning sidings also exist at Bishops Stortford, while the sidings in the yard at Chingford were specially remodelled to provide two groups of carriage cleaning facilities, containing a washing plant. Every fifth day, the trains will be examined at Ilford depot where they will also be specially cleaned with an acid solution.

At Chingford, Enfield Town and Hertford East the machines provided are of the intermediate type, and consist of two pairs of rotating felt flail shafts arranged to give a wiping action in each direction on the sides of the coaches. Water is sprayed on to the sides of the vehicles before, during and after the washing process. The machines operate automatically by means of photo-electric cells, positioned approximately 40 ft. in advance of the machines. When the light beams are broken by the passage of a train, the machine automatically starts. A few seconds after the train has cleared the light beams, the machine stops.

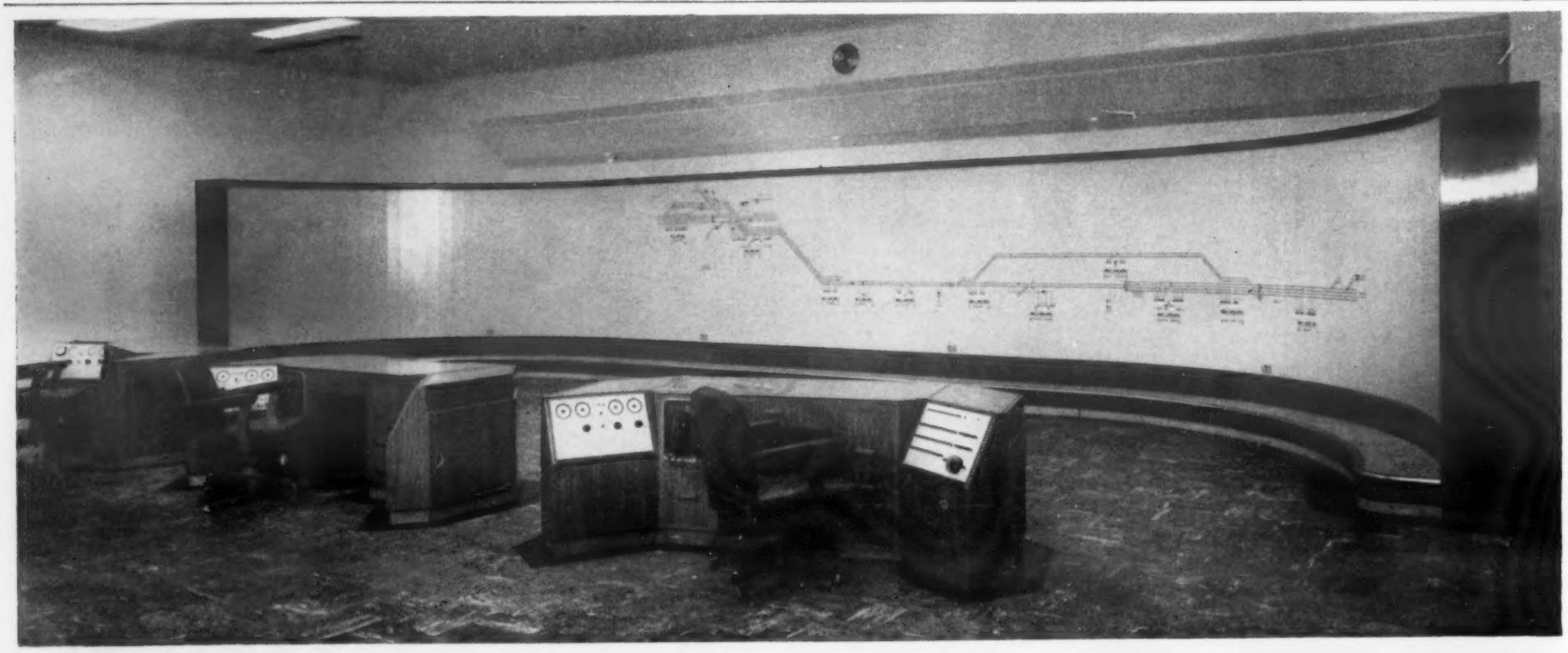
The felt flails, approximately 2 ft. long, are attached to aluminium tee bars, which are then carried in discs attached to the main spindles. The discs have three distinct rows of slots so that, as the end of the flail wears, or is torn, the flail carriers can be moved radially outwards to compensate for the wear. The flail carriers are easily removed from the machine and a spare set is provided to enable re-felting to be carried out with minimum inconvenience and the machine kept in service. The fresh water used for carriage washing is taken from public supplies and held in an underground storage tank, whence it is pumped to the washing machine at the rate of 200 gallons per minute and not recovered.

(To be continued)

Use of "suspense" posters to advise the public of the new services



Track layout at the new Broxbourne and Hoddesdon station showing island platforms and the facilities for dividing and rejoining Bishops Stortford and Hertford East trains



SUPERVISORY CONTROL BY A.T.E

AUTOMATIC TELEPHONE & ELECTRIC CO. LTD.
Strowger House, Arundel Street, London, W.C.2. Telephone: TEMple Bar 9262. Cables: Strowger, London
Strowger Works, Liverpool, 7, England. MANUFACTURERS OF SUPERVISORY CONTROL EQUIPMENT

In the modernisation programme of British Railways, the electricity supply for traction is to be controlled from area control centres.

The control room equipment at Crewe, together with the associated apparatus at the various feeder-station and track sectioning points, was manufactured and installed by A. T. & E. Co. and controls the supplies to the Manchester/Crewe section of the London Midland Region main line. The lines to Liverpool, will also be controlled from the same room. Similar equipment has been supplied and installed on the Glasgow suburban electrification scheme in the Scottish Region.

AT 4691

SOCIAL AND PERSONAL

The Late Sir John Thornycroft

WE deeply regret to record the death, at the age of 88, of Sir John E. Thornycroft, chairman and governing director of John I. Thornycroft and Co., Limited. He had been actively engaged in the management side of his father's business since 1895. A portrait and biography appear on page 11. Lieut-Cdr. J. W. Thornycroft, his elder son, succeeds him as chairman and managing director of the company.

* * *

Mr. L. C. Batt, formerly assistant secretary, has been made secretary of S. Instone and Co., Limited.

* * *

An enthusiastic reception greeted H.M. Queen Elizabeth the Queen Mother when she visited the Castle Mills, Edinburgh, factories of the North British Rubber Co., Limited. On arrival Her Majesty was welcomed by Lord Provost J. Greig Dunbar, who presented Mr. Foster M. Stewart, managing director. Other directors presented were Mr. Alexander Johnston, J.P. (former managing director who escorted the Queen Mother when she visited Castle Mills in 1941), Sir William Wallace, C.B.E., LL.D., Mr. Ralph D. Hunt (deputy managing), Mr. T. A. Clayton, M.A., and Mr. E. F. Bray. In addition to a tour of the new hose factory, part of the company's £3 million modernisation programme completed a year ago and reckoned to be the most modern factory of its kind in Europe, Her Majesty visited the tyre factory to see final stages in the manufacture of U.S. Royal tyres.

* * *

We regret to record the death of Mr. R. M. Atkinson, M.I.Mech.E., M.I.Mar.E., chairman of Sulzer Brothers (London), Limited. He was 70.

The late Mr. Atkinson

Mr. Atkinson was educated at Oundle School and Sheffield University, after which he became an engineering pupil with Vickers, Limited. From 1916 he was seconded to the Ministry of Munitions as Director of Forgings and Castings and later to the Air Ministry as Director of Materials and Supply (Rolls - Royce engine branch). From 1919 to 1924 he was deputy manager of the railways department of Vickers-Armstrongs, Limited, after which he undertook extensive travelling for Vickers, Limited, and associated companies, in connection with overseas sales policy. After some 30 years with Vickers he left in 1938 to join the Sulzer organisation as managing director of Sulzer Brothers (London), Limited, a position he held until his appointment as chairman in June this year. In 1952 he joined the board of Richardsons, Westgarth and Co., Limited, and its subsidiary, George Clark (Sunderland), Limited, which appointments he retained until his death.

* * *

The Ministry of Aviation announces that Mr. L. R. Beesly has been appointed Director-General of Aircraft Production. Mr. F. E. McGinnety has been appointed Director-General of Inspection.

* * *

The Skefko Ball Bearing Co., Limited, announces that Mr. A. I. Helm, hitherto plant engineer, has been appointed works manager of the proposed new factory at Irvine, Ayrshire.

* * *

We record with regret the death of Mr. C. E. Jefferson, who was vice-president, traffic, Canadian Pacific Railway, from 1950 until his retirement in 1957. He was 71.

* * *

As a consequence of the death of Sir Cecil Weir, International Computers and Tabulators, Limited, has appointed Mr. H. V. Stammers acting chairman. Mr. C. Mead is to be a deputy chairman, Mr. J. Bull is managing director.

* * *

Mr. H. West, M.I.Mech.E., M.I.E.E., managing director of Associated Electrical Industries (Manchester), Limited, has been appointed to the board of Associated Electrical Industries, Limited, with effect from January 1, 1961. Mr. West is a former director of engineering with Metropolitan-Vickers Electrical Co., Limited.

* * *

Mr. Newton M. Bacon has become a member of the Mersey Docks and Harbour Board in the place of Mr. John A. Holt, M.B.E., who recently resigned. Mr. Bacon is a partner in Messrs. Sivewright, Bacon and Company, and will serve on the marine and traffic, and warehouse committee of the Board.

* * *

Lord Geddes, a former member of the Scottish Tourist Board, has been elected deputy chairman of the British Travel and Holidays Association in succession to Sir Howard Roberts, who has retired from the board of the Association. Lord Geddes is a director of P. and O. and a number of other companies.

* * *

We regret to record the death of Mr. C. G. G. Dandridge, chief commercial manager of the Eastern Region of British Railways at the time of his retirement in 1955. He became a railwayman at the early age of 15 in the service of the former Great Central Railway. He entered the Royal Engineers in 1915, at the end of his training, and his linguistic attainments took him into various theatres of war, including Russia. He reached the rank of major. After the war, he quickly gained promotion and in 1923, at a comparatively early age for those days, he became district passenger manager of the L.N.E.R. at Manchester. Three years later his success in that sphere led to his appointment as d.p.m. in London. He developed a flair for publicity and advertising and was chosen to become advertising manager of the L.N.E.R. in 1928. For the next 11 years he did much to improve the style and standard of railway advertising and publicity. Mr. Dandridge became passenger manager, Southern Area, L.N.E.R., in 1944, after assisting his predecessor in that office for a couple of years. When the railways were nationalised he was appointed commercial superintendent, Eastern Region, subsequently being styled chief commercial manager. For many years he was actively concerned with the railway journeys of the Royal Family and H.M. the Queen bestowed upon him the honour of C.V.O. in 1948.

Mr. B. R. Farrow has been appointed a director of Wellworthy, Limited. He has been home sales manager for a number of years, and latterly general sales manager.

* * *

We regret to record the death of Mr. E. Windle, chief locomotive draughtsman, London and North Eastern Railway, who was in office at the time of designing the A4 class. He was 68.

* * *

Mr. W. M. Dravers has been appointed chairman of Thomas Brothers (Port Talbot), Limited, in succession to Mr. W. T. James, O.B.E., who has resigned from the board of the company in view of his impending retirement. Mr. F. K. Pointon has been appointed a director of the company.

* * *

The formation of a group sales organisation, with the title Duple Group Sales Co., Limited, to market the Duple group products, follows the acquisition of H.V. Burlingham, Limited, recently. Mr. R. E. Brown becomes its director of sales, Mr. G. A. H. Payze general sales manager and Mr. R. Beechey Newman fleet sales manager.

* * *

Mr. W. N. Griffiths, A.M.I.Mech.E., M.I.Loco.E., has been appointed running and maintenance officer, divisional traffic manager's office, Cardiff, Western Region, B.R. A former G.W.R. apprentice, in 1953 he was appointed district motive power superintendent, Cardiff, which post was re-designated district running and maintenance officer in 1957, and is now vacated by Mr. Griffiths.

* * *

Sir Gerard Clauson, K.C.M.G., O.B.E., has accepted the invitation of the board of Pirelli, Limited, to become chairman of the company in succession to the Right Hon. Peter Thorneycroft, P.C., M.P., who resigned in July last on his appointment as Minister of Aviation. Sir Gerard has had a distinguished career in the Army, and the Colonial Office where he was Assistant Under-Secretary of State from 1940 until his retirement. Before joining the board of Pirelli in 1953, Sir Gerard took a keen interest in the world rubber industry, and in 1951 was chairman of the International Rubber Conference. He was made a member of the Order of the British Empire in 1919 and created a Knight Commander of St. Michael and St. George in 1945.

Sir Gerard Clauson

* * *

Mr. Raymond W. Birch, M.I.Mech.E., a director of the South Wales Transport Co., Limited, has been appointed chairman of the company in succession to Mr. W. T. James, O.B.E., who has resigned from the board of the company in view of his impending retirement. Owing to the pressure of other business commitments, Mr. J. Spencer Wills has also resigned from the board of the company. Mr. E. L. Taylor and Mr. F. K. Pointon have been appointed directors.

* * *

At a meeting of Public Opinion Action Association to be held on December 14, at the Midland Institute, Birmingham, coloured films will be shown by members of the Midland Area Committee of the Railway Development Association. They include scenes in Wales, England and the Isle of Man and in many cases have been taken to afford pictorial evidence of the kind of operating techniques advocated by the Association in suitable cases with a view to reducing passenger-seat-per-mile-in-traffic costs and overheads attributable to passenger operation. Amongst such aspects of the subject are views of unfenced level crossings with cattle guards in use with passenger trains; people using the new unstaffed halts on the Banbury—Buckingham—Bletchley line; and patrons buying tickets from the guard while a railcar is in motion.

* * *

Mr. R. Shervington, who has been appointed traffic superintendent, South Eastern Division, Southern Region, B.R., joined the Southern Railway in 1934. He spent a year in the audit accountant's office and in 1936 he was posted to the superintendent of operation's timetable section, Waterloo. From the outbreak of war till May, 1946, Mr. Shervington was in the Army—firstly, in the King's Royal Rifle Corps, then in the Royal Engineers, in which he was commissioned, and the Indian Engineers. He went to India in 1942, serving as chief yardmaster, Chittagong, and operating officer and locomotive running officer in those areas of the East Bengal Railways which were under military operation. In 1946 he returned to the superintendent of operation, first in the freight stock and then in the electric rolling stock sections. From 1947 to 1949 he was in the London East divisional superintendent's office and in 1949 he was appointed assistant to the London West divisional superintendent. In 1954 Mr. Shervington became assistant district traffic superintendent, Southampton, and in 1955 assistant district traffic superintendent, Woking. He attended the Administrative Staff College, Henley, in 1953.

Mr. R. Shervington

* * *

We regret to record the death of Mr. F. J. Slee, who retired in October, 1959, from the position of joint lubricants manager of Shell-Mex and B.P., Limited. He was 61.

* * *

We deeply regret to record the death of Mr. W. A. Moens, who retired early this year from the position of sales manager, national sales, in the Tyre Division of the Dunlop Rubber Co., Limited. He was 60 years of age.

* * *

Mr. K. F. Mason has been appointed district traffic superintendent Chester, London Midland Region, B.R. He began his railway career with the L.M.S.R. in 1934. He became assistant district goods manager (sales), Manchester, 1955, and in March, 1958, district goods manager, Warrington, the position he leaves for his new appointment.

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CLASSIFIED ADVERTISEMENT

CLASSIFIED ADVERTISEMENTS should be addressed to THE MANAGER, Classified Advertisements, MODERN TRANSPORT, Russell Court, 3-16 Woburn Place, London, W.C.1.

RATES.—The minimum charge for classified advertisements is 7s. for 14 words or less, and 6d. for each additional word. The name and address of the advertiser is charged at the same rate. If a box number is used 2s. extra is charged to cover our name and address and postage. If set in paragraph form each paragraph is estimated separately. Official Notices and semi-display in the classified columns are charged at the rate of 40s. per single column inch.

ACCEPTANCE.—Advertisements can be accepted up to 2.30 p.m. on Monday to ensure insertion in the current week's issue. MODERN TRANSPORT is on Sale every Friday.

[Other Classified Advertisements appear on page 16]

SITUATION VACANT

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Require two years' varied railroad engineering service, or five years in direct charge of track crews. Will supervise 135 men maintaining 45-mile railroad, assign work, order materials, be responsible for safety, make regular detailed inspections of roadbed and all track on main line, sidings and yards, bridges, tunnels, etc. Will make engineering calculations relating to maintenance and use of structure and equipment. Must speak Spanish. Married or single candidates acceptable.

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LONDON
22-24 Bermondsey Wall West S.E.16
BERmondsey 4533

CARDIFF
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CARDIFF 21631

SWANSEA
Exchange Buildings
SWANSEA 54171/5

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CITY 3381

LIVERPOOL
11 Old Hall Street, Liverpool, 3
CENTRAL 6396

NOTTINGHAM
Pavilion Building, Pavilion Road, West Bridgford
NOTTINGHAM 83481

IMPORTANT CONTRACTS

B.M.C. Manufacture in Colombia

ARRANGEMENTS have been made under an agreement signed recently for British Motor Corporation commercial vehicles to be assembled and progressively manufactured in the South American republic of Colombia, a market virtually closed to British vehicles for some years due to lack of sterling. The company associated with the B.M.C. is Colmotores S.A., Bogota, which has already built a factory, at present the only vehicle assembly and manufacturing plant in Colombia. Progress is being made with the installation of plant. It is anticipated that initially some 5,000 vehicles will be produced a year, building up to higher figures as the enterprise proceeds. First shipments of the four-wheel-drive Austin Gipsy (known in South America as the Nomad) and B.M.C. commercial vehicles will be on their way before the end of the month.

Austin Ambulances for L.C.C.

As part of a replacement programme, the London County Council Health Committee has ordered 72 Austin ambulances at a cost of about £140,000.

C.I.E. Orders Leopards

Coras Iompair Eireann has ordered 80 Leopard single-deck bus chassis from Leyland Motors, Limited.

Air France Orders more Boeings

Air France has ordered an additional three Boeing 707-328 jet air liners for delivery in spring, 1962, bringing this operator's total of Boeing intercontinental jet aircraft to 20.

Birmingham Orders Daimler Fleetline

Birmingham City Transport has ordered 10 Daimler Fleetline rear-engined double-deckers for early delivery with a view to obtaining service experience with the new type under varying operating conditions, prior to placing bulk orders as part of the city's transport modernisation.

Rawlings Windows for C.T.B. Buses

Referring to our paragraph last week on recent orders by Ceylon Transport Board, Rawlings Manufacturing Co., Limited, has won a large contract for windows to be fitted to new buses now being built for that undertaking.

Powell Duffryn Wagons for Esso

The Powell Duffryn Engineering Co., Limited, has been awarded a contract valued at approximately £90,000 for 50 rail tank wagons for Esso Petroleum Co., Limited. The wagons are 35 tonners for the conveyance of Class A liquids and are fully fitted for fast traffic. Particular features are scroll iron type suspension with auxiliary rubber springs and bottom charge and discharge equipment in addition to the conventional syphon pipe.

Australian Locomotive Order Doubled

The Queensland Government will place an order with the English Electric Co., of Australia, Limited, for a further five 90-ton locomotives costing about £500,000. Announcing this, the Transport Minister, Mr. G. W. W. Chalk, said the company was now in the final stage of carrying out an order for five locomotives for use on the Townsville—Mt. Isa railway. In increasing the order to 10, the Government had been influenced by the increased traffic requirements on this section of the state railway system.

Baghdad Orders more A.E.C. Buses

Baghdad Passenger Transport Service stresses its confidence in A.E.C. vehicles by the placing of its fifth repeat order with A.E.C., Limited, this time for 80 Regent V double-deck bus chassis, to be fitted with Park Royal bodies. Total value of the order is in the region of £700,000 and the bodies will be shipped partly knocked down, for assembly by the operator. The latest order brings the total of A.E.C. buses for Baghdad to 200 double-deckers and 300 single-deckers.

Canadian Locomotives for New Zealand

A tender by General Motors Diesel, Limited, Canada, has been accepted by the Minister of Railways, New Zealand, for 12 diesel-electric locomotives similar in type to the 1,425-h.p. main-line units now in service on the North Island railways. The additional locomotives are required for freight haulage on the Napier and New Plymouth lines, and some will augment the diesels in use on the main trunk route, replacing some of the oil-burning K steam locomotives, now 30 years old, which are expensive to run and becoming increasingly costly to overhaul.

Perkins Engines in Greek Tractors

Approval by the Greek Government of a scheme to produce farm tractors in Greece fitted with British diesel engines has led to an order being placed with Perkins Engines, Limited, for 850 three- and four-cylinder engines. The project has been launched by Petros Petropoulos and Company, Athens, Perkins distributor in Greece for a number of years, which plans to produce P35 (35-h.p.) and P55 (55-h.p.) tractors for the Greek home market. An ultimate production of about 2,000 tractors a year is envisaged; the engines will be supplied from Peterborough and a long-term contract between the British and Greek companies provides for a gradual inclusion of components produced in Greece.

New Look Leyland Double-Deckers

Double-deck buses with a new frontal appearance have been ordered from Leyland Motors, Limited, by the municipal transport departments of Cardiff, St. Helens and Wigan and the Yorkshire Woollen District Transport Company. The new look is imparted by a new engine cowling, radiator grille and bonnet cover fabricated in glass fibre-reinforced plastics, designed jointly by Leyland Motors and Mr. John C. Wake, general manager and engineer of St. Helens Corporation Transport; the structure has been developed with the aim of improving all-round vision for the driver and producing a more rigid and distinctive unit. Apart from a slight weight saving, the use of plastics provides an excellent sound and heat insulated structure which has high resistance to corrosion. St. Helens has ordered 25 Titan PD2A30, Wigan 14 Titan PD3A2, Cardiff five Titan PD2A30 and Yorkshire Woollen District nine Titan PD3A1, all fitted with the new front end.

SHIPPING AND SHIPBUILDING

Improvements to Welland Canal

A FENDER system on the entrance walls of certain locks on the Welland Canal, part of the St. Lawrence Seaway, will be constructed this winter. Standby diesel engines for vertical lift bridges over the canal will be supplied and installed in a continuing three-year programme, as will a number of gear speed reducers for the bridges. Changes in the hydraulic system at other locks on the Welland to increase speed of filling and emptying will be made under a contract for which the Authority will call for tenders this week. All these improvements are designed to accelerate transits of the canal, which is a bottleneck in the seaway. The canal, providing a 327-ft. lift between Lake Ontario and Lake Erie, will be closed to navigation on December 15 and appropriate reaches of its 27 miles will be unwatered immediately afterward to permit a considerable amount of modification and improvement to be accomplished during the non-navigation season.

Minister to Visit Northern Ireland

THE Minister of Transport has received a deputation from the Ulster Members of Parliament at Westminster, in the course of which he said that, following recent discussions between ministers of the Government of Northern Ireland and the Government, it was his intention to visit the Harland and Wolff shipbuilding yard in Northern Ireland as soon as his programme of work would permit. He told the deputation that the first date he could manage was December 5, and this date has now been arranged for the visit.

Newest Replaces Oldest

THE Cunard Line announces that the 22,000-ton *Sylvania* is to take the place of the *Britannic* (which is to be withdrawn from service following her arrival at Liverpool on December 3) in the Liverpool—New York service. The *Sylvania* will operate with the 13,500-ton sister ships *Media* and *Parthia* in the Liverpool—New York service and, like the *Britannic*, she will call regularly at Cobh both westbound and eastbound. The *Sylvania*, newest Cunarder, was placed in service in 1957; the *Britannic* dates from 1930.

Channel Islands Sea Fares Go Down

FARES on the new steamer services to the Channel Islands, which start next May, are to be drastically cut, despite the introduction of one-class sea travel on new ships, claimed to be better than the existing first-class standard. The new one-class return fares between Weymouth and either Jersey or Guernsey will be £4 14s. 6d.—£2 15s. below the present first-class fare and 11s. less than the second-class fare. This is the result of streamlining the services and concentrating them on Weymouth. Both first- and second-class accommodation will still be provided on boat trains.

Clyde Order Book Dwindling

WARNING of impending redundancy at the Barclay, Curle yards in Glasgow was given following the launch of an 8,300-ton motorship there last week. There are now only two ships on order at this Whiteinch yard, modernisation of which was recently completed at a cost of more than £3 million. The chairman of the company, Mr. J. Gilchrist, said that the refusal to have modern equipment properly manned by the right number of operators, as well as constant wage demands, strikes and overtime bans, were helping to kill the goose—and it was by no means a golden goose. He appealed for a united effort to eliminate inefficiency and genuinely to use the modern capital equipment to the best advantage.

Go-Ahead Leith

THE steady development of traffic at Leith has been largely a result of progressive management and good labour relationship, providing fast turnround of ships and economic working. The reclamation of land and setting up of new industry are further aspects of a very progressive policy. At the recent meeting of the Leith Dock Commissioners, the chairman, Mr. P. Chalmers Somerville, paid tribute to Mr. A. Balfour Kinnear, general manager and secretary, who is currently visiting Sweden. He is there to assess the further development of Leith in the light of Scandinavian needs. Evidence of the successful expansion programme was mentioned in the attraction of a new depot for Fisons Fertilisers, Limited, which will make Leith its major Scottish port and bagging centre. Efforts are also being made to improve ancillary services including transport and haulage companies are being invited to locate themselves within the port area, for storage and operation.

★

FINANCIAL RESULTS

NOTES on the trading results, dividends and financial provisions of companies associated with the transport industry are contained in this feature, together with details of share issues, acquisitions and company formations or reorganisations

Transport Development Group

Particulars of an issue by the Transport Development Group, Limited, of 280,000 6 per cent cumulative preference shares of £1 each have now been published. The issue is being made partly to finance the further agreement in respect of Bristol Industries, Limited, announced in our November 5 issue.

Walker Brothers (Wigan)

Walker Brothers (Wigan), Limited, and John Wood and Sons, Limited, have been amalgamated and trade under the name of Walmsleys (Wigan), Limited. Walmsleys (Wigan), Limited, undertakes to pay, satisfy, discharge and fulfil all the debts, liabilities, contracts and engagements of Walker Brothers. Manufacturing operations will be continued as heretofore at Pagefield Works, Wigan, and Barley Brook Works, it is stated. Both companies have been controlled by the Walmsley (Bury), Group, Limited, a holding company. John Wood and Sons operates the Barley Brook foundry. The Walmsley group is largely concerned with pulp- and paper-making machinery.

Guy Motors

Guy Motors, Limited, reports a group loss of £444,864 for the year ended July 31 (£232,164). The loss is after depreciation of £117,455 (£107,073) and crediting £7,261 (£20,000) tax recoverable. After providing £15,692 for subsidiaries reorganisation and formation expenses, there is a total deficit of £412,852 to carry forward—a credit of £47,704 was brought in after transferring £200,368 from general reserve a year ago. Last payment on the ordinary was 7½ per cent for 1956-57. Home trading was unsatisfactory on account of supply difficulties and manufacturing costs. Trading conditions in South Africa deteriorated. The company has a seven-month order book, it is stated, and in the current year home orders are one-third up on the same period of last year. Production is up one-third.

ALUMINIUM AND THE ROADRAILER

A revolutionary design by Pressed Steel Company Ltd., in conjunction with British Railways, the metallurgical "know-how" of High Duty Alloys Ltd., and Alcan aluminium ingot, go to make Britain's newest form of transport—the Roadrailer.

Now it's a truck. Now it's a train. It saves money both ways.

1 *After loading at the factory, the Roadrailer is driven to the nearest rail depot by an ordinary tractor unit.*

3 *Made up into a train, the Roadrailer makes its main journey overnight to most towns in Britain, at speeds up to 70 m.p.h.*

2 *At the depot, the road wheels are retracted and the rail wheels are lowered.*

4 *At destination, the Roadrailer is quickly converted back to a lorry and completes its delivery by road. Other versions are planned by Pressed Steel Co. Ltd.*

HERE is a really new idea in transport, designed to bring the factory to your door, speed deliveries, and cut transport costs. It combines in one vehicle both the terminal "fetch and carry" speed of a lorry, with the long-distance economy of a 70 m.p.h. freight-train.

Aluminium has played an indispensable part in the development of the Roadrailer. Because the metal is *both* robust and very light, the designers have used it exclusively in the construction of the body. Using the sides as the main strength members they have been able to give the Roadrailer shown here *both* high volume capacity and heavy payload capacity, i.e., combining 1,400 cubic feet of capacity with a maximum payload of 11 tons.

The metal's light weight also compensates for the extra weight of the alternate wheel system. What aluminium saves in dead weight can be taken on in extra payload.

Years after they go into service the Roadrailers will be structurally as sound as when new and, after washing, just as clean in appearance. That's because, unlike ferrous metals, aluminium does not rust. And it looks particularly good, even when it is unpainted.

Alcan supplied the aluminium used by High Duty Alloys in the British Railways Roadrailer. Not surprisingly, as Alcan are Britain's leading suppliers of aluminium, and the world's largest exporters, and are working, through research and development, to bring aluminium's lightness, long life, and economy to every field of transport.

Britain's most widely used aluminium

ALCAN ALUMINIUM

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